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IN discussing the causes and mechanism of tremor I include not only rhythmic tremors but also irregular and incoördinate movements, and before we can attempt to understand the different varieties of tremor and irregular movement, it will be advisable to refresh our memory on some points of the physiology of muscular contraction and of the anatomical connexions of the various nervous mechanisms concerned in the regulation of voluntary movement. Skeletal, striped, or voluntary muscle-fibre depends for its tonus and nutrition upon the integrity of a lower motor neuron, the anterior horn cell and its axon, or peripheral motor nerve. All efferent impulses to the muscle reach it through this motor nerve-fibre, named by Sherrington the Final Common Path, whereas there are numerous afferent paths of sensory fibres from the muscle and from other structures influencing the stimuli either by inhibition or by excitation, which ultimately reach the anterior horn cell. It is the various sites of lesion in these other mechanisms which determine the clinical forms of the irregular movements which are expressed by the different forms of stimuli reaching the muscle by this final common path, the motor nerve-fibre.

First, what do we understand by muscle tonus? It is a comparatively steady condition of partial contraction of the various fibres making up a muscle, due to rhythmic volley firing of motor impulses emitted from the numerous anterior horn cells supplying the muscle. Even a small muscle as the flexor brevis pollicis is supplied by at least 200 motor axons, each of which breaks up into about 30 fibrillæ. If these impulses are completely cut off, as by section of the nerve, then the muscle tissue lies completely inert and flaccid, and its structure quickly becomes disorganised, wasting away, and unrecognisable as muscle tissue after some weeks.

So long as the lower motor neuron and muscle-fibre are healthy, these continual rhythmic impulses maintain the nutrition and tonus of the muscle. These impulses seem always to be of maximal strength, for any stimulus that can overcome the normal refractory limit of a nerve-fibre starts a maximal impulse, that is to say, it is all or none. Varying degrees of strength of maximal contraction are due to more and more cells firing in volleys at the same time, until when all are at work the maximal muscular contraction has been reached, which cannot be increased by augmenting the stimulus. Relaxation of a muscle is as important as contraction, and any stimulus which contracts the flexors, at the same time relaxes the extensors when all mechanisms are acting normally. Sensory impulses are continually passing up to the cord via the posterior roots from the muscles, skin, and joints, and reflexly exert influences upon the anterior horn cells either directly across synapses, or indirectly via the posterior columns and afferent cerebellar tracts, so that the amount of required muscular contraction is kept steady. Without these afferent mechanisms working properly, the efferent motor stimuli will at once become jerky, as in disseminated sclerosis, tabes, Friedreich's disease, &c.

The cerebellum is the chief coördinating centre for muscular movements, and it receives its afferent stimuli from the muscles and other peripheral structures partly via the posterior columns and posterior column nuclei, and partly via the direct cerebellar and ascending antero-lateral tracts.

The direct cerebellar (D.C.) reaches the cerebellum by the inferior peduncle or restiform body, and the smaller tract through the superior peduncle. The cerebellum also has important crossed connexions through the middle peduncles with the opposite frontal and motor cortex, while it has efferent paths to reach the spinal cord through the opposite red nucleus, and through Deiters's nucleus of the same side. The cerebellum has, therefore, indirect control on musculature by its crossed connexions to the opposite frontal and motor cortex, and the rubro-spinal tract, and also direct efferent paths to the anterior horn cells via Deiters's nucleus and the vestibulo-spinal tract of the same side.

Spinal Disorders

The simplest forms of tremor to understand are those of spinal origin. The fibrillary contractions of parts of various muscles, such as the first dorsal interosseous, or the extensors of the fingers, or deltoid, that are so familiar in progressive muscular atrophy, are clearly due to the progressive wasting of groups of anterior horn cells interrupting the rhythmic volley firing of the nerve-cells, and thus setting up irregular or incoördinate explosions of the clonic impulses resulting in visible contractions. Fibrillary tremors are thus a valuable clinical sign in the differentiation of progressive muscular atrophy of spinal origin from other forms of atrophy, such as the primary myopathies. Fibrillation of muscles, or *myokymia*, is a fairly frequent phenomenon in many normal individuals, varying under different conditions, especially in fatigue, and when unassociated with progressive atrophy and weakness it is to be looked on as an expression of differing nutritional influences upon the irritability of the anterior horn cells, and of no serious significance. *Myoclonus* or paramyoclonus, also of spinal origin and unassociated with wasting, is characterised by irregular contractions of muscles and parts of muscles, as distinct from coördinated movements, such as are seen in chorea.

We have already said that the anterior horn cell is influenced by numerous other cell groups and reflex actions of various kinds. These stimuli reach the anterior horn mainly by four routes, which we may designate by arrows pointing downwards along the cord (see Diagram).

Cerebrum and Cerebellum

Perhaps the most important of these is the pyramidal fibre, which takes its origin in a Betz cell in the opposite motor cortex, passing downwards through the internal capsule, and decussating in the pyramid of the medulla to reach the opposite crossed pyramidal tract in the spinal cord. This upper motor neuron is continually supplying the lower motor neuron with tonic impulses of various kinds and strengths, mainly of an inhibitory nature and more or less opposite in kind to tonic impulses supplied by the opposite half of the cerebellum. Lesions, therefore, of the motor cortex or of its axons in the internal capsule lead not only to hemiplegia or paralysis of the opposite arm and leg but also to rigidity. Now this type of rigidity, together with that seen in chronic disease of the corpus striatum, is of the same kind, though naturally less severe in degree, than that seen in the so-called decerebrate

* A clinical lecture delivered at St. Mary's Hospital on Nov. 8th, 1934.

rigidity in the experimental animal, whose hemispheres have been amputated through the brain stem above the level of the red nuclei. We owe this demonstration to Sherrington, who also proved that electrical stimulation of the cerebellar cortex at once relaxed this decerebrate rigidity as long as the stimulus lasted. The decerebrate animal will stand with limbs extended, motionless for days, clearly proving that the cerebellum through its dentate nucleus and its connexions to the opposite red nucleus supplies tonic extensor impulses to the anterior horns through the rubro-spinal tract, which could be inhibited temporarily by electrical stimulation of the cerebellar cortex. This rubro-spinal tract decussates by means of Forel's decussation to reach the lateral columns of the opposite side of the spinal cord, and thus the cerebellum, by means of a double decussation, exerts its influence upon the musculature of the same side of the body.

Cerebellar influences may also reach the cord by an uncrossed pathway, through its connexion with Deiters's nucleus and the vestibulo-spinal tract. Cerebellar lesions thus tend to produce hypotonia, or undue relaxation of the musculature on the same side of the body, whereas cerebral lesions give rise to hypertonia, or rigidity of the opposite side. It may thus be expressed: that irritant cerebellar lesions produce tonic spasms, the so-called cerebellar fits, while negative degenerative lesions produce hypotonia of the same side. On the other hand, negative degenerative cerebral lesions produce paralysis and rigidity of the opposite side, with increase of deep reflexes, while irritant cortical lesions produce clonic convulsions followed by flaccidity and loss of deep reflexes.

The *knee-jerk*, as a type of deep reflex, is not a simple idio-muscular contraction produced by a sudden stretching of the muscle when tapping its tendon, but is a true reflex, as is shown by its inhibition by stimulation of sensory nerves, or slight involuntary flexor action of the hamstrings. It was formerly thought that there was insufficient time for afferent and efferent stimuli to run up and down from knee to spinal cord, and for the necessary passage of the stimuli across the synapses in the cord itself, but of late years it has been shown that the speed of passage of the impulse along mammalian nerve may be as high as 120 metres per second, which allows sufficient time for the whole process to be a reflex. The afferent portion of the reflex does not arise from the skin or tendon tapped, because the tapping may be applied far from the muscle or tendon, as in testing the biceps jerk by tapping the radius near the wrist when the forearm is semi-flexed. This produces a sudden stretching of the biceps, which causes it to contract. Even better proof that the stretching of the muscle is the origin of the afferent stimulus for the reflex is the apparent simultaneous contraction of the triceps, which can be observed if carefully looked for. This is due to the sudden stretching of the triceps by the flexion of the forearm by the biceps contraction, and if timed carefully by suitable apparatus would be found to occur a fraction of a second later than the biceps contraction.

The cells in the motor cortex are exposed to numerous afferent stimuli along reflex paths from other centres by fibrillæ which impinge upon the pieds terminaux, or small protuberances along the sides of the cell body. Thus, the irritability of the cell will be affected by emotion experienced by the intellectual centres, fright, anger, love and hate, and other manifestations of consciousness, in addition to stimuli reaching it from the corpus striatum and thalamus of the same side, and from the opposite half of the cerebellum. You may shiver with cold or from fright, or shake with rage, or quiver from excitement and pleasure. Any or all of these influences will affect the intensity of the efferent stimuli from the Betz cell to the pyramidal fibre and the opposite anterior horn cells. In addition the basal ganglia, corpus striatum, and thalamus have a direct pathway for efferent stimuli to reach the anterior horn cells. Beneath the thalamus and in connexion with it lie the red nucleus and the substantia nigra, while the hinder portion of the lenticular nucleus is connected with the thalamus and the red nucleus by a special bundle, the ansa lenticularis. The red nucleus also receives stimuli along the superior peduncle from the dentate nucleus in the cerebellum, and from the red nucleus arises the rubro-spinal tract, which crosses over to the opposite side in Forel's decussation and runs down in the lateral columns of the cord. The corpus striatum can thus affect the lower motor neuron indirectly through its connexion with the thalamus and the rubro-spinal tract, and also through its afferent connexions to the cerebral cortex. Whether there is also a direct efferent path from the corpus striatum into the spinal cord has not been demonstrated, but for the sake of simplicity I have indicated its effects by the dotted line parallel to the pyramidal fibre and the rubro-spinal tract. In addition to these three routes for efferent stimuli affecting the anterior horns, there is a fourth, the vestibulo-spinal tract. The vestibular portion of the auditory nerve arises in the labyrinth, ends in the lateral auditory nucleus or nucleus of Deiters, which has connexions with the cerebellum, and emits the efferent fibres to the cord known as the vestibulo-spinal tract. The vestibular nerve is concerned with the power of balancing and the recognition of the position of the body in space, and lesions of it produce that form of incoördination known as titubation.

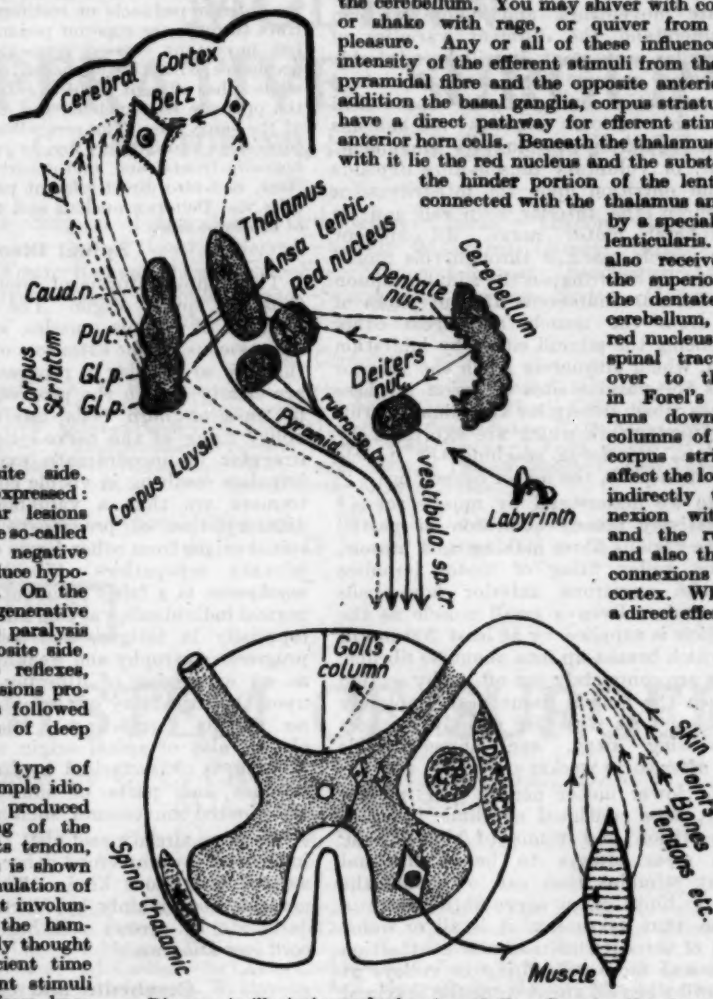

Diagram to illustrate cerebral and cerebellar efferent paths of muscular control

CP = crossed pyramidal. DC = direct cerebellar tract

In considering the effect of chronic degenerative lesions of the brain, we must remember that we are dealing with a process of dissolution, and that the

symptoms associated with such diseases are not positive effects of the lesions concerned, but due to the loss of the tonic stimuli from the part concerned, and to the unopposed tonic stimuli proceeding from other centres. This we have already referred to in connexion with the rigidity seen in hemiplegia and chronic disease of the corpus striatum, which may be compared with the more intense rigidity of the decerebrate animal.

Hughlings Jackson used to teach of three levels of dissolution, the frontal cortex, motor areas, and the spinal cord, and he foreshadowed the opposing effects of cerebral and cerebellar influences, later proved experimentally by Sherrington.

Clinical Classification of Causes

We may now turn to a clinical classification of causes of incoördination and tremor, which for convenience may be divided into eight groups :—

TREMOR, ATAXY, AND SPASM

1. *Psychotic.*—Emotion, hysteria, neurasthenia, fright, shell-shock, tics or habit spasms.
2. *Toxic.*—Alcohol, mercury, manganese, hyperthyroidism.
3. *Cortical degenerations.*—G.P.I., various forms of encephalitis, senile, familial, arterio-sclerosis, Huntington's chorea, ? Sydenham's chorea, diplegias.
4. *Corpus striatum.*—Wilson's disease, torsion spasm, athetosis, paralysis agitans, and parkinsonism.
5. *Thalamus, red nucleus, substantia nigra, corpus Luysii.*—Thalamic syndrome, various violent choreas, various post-encephalitic phenomena.
6. *Cerebellar.*—Friedreich's and other hereditary ataxias, cerebellar tumour, and vascular lesions.
7. *Spinal cord.*—Myoclonus, myokymia, P.M.A., disseminated sclerosis, tabes.
8. *Nerve.*—Clonic facial spasm.

1. The *psychotic* group need not delay us as their effects are self-evident.

2. Amongst *toxic* causes, hyperthyroidism and Graves's disease show fine tremors and other symptoms resembling grave neurasthenia. Acute and chronic alcoholism as a cause of fine tremor are well known, and chronic alcoholism sometimes may somewhat closely resemble G.P.I., for Argyll Robertson pupil is not unknown in chronic alcoholism without any specific infection. Mercury poisoning is met with in workers in electrical gauges, and formerly in thermometer and mirror makers. Furriers may also suffer through absorption of mercury nitrate. The tremor is rather coarse in type and sufferers from it have been compared with marionettes on wires. Manganese poisoning may affect the cortical cells, but is also liable to cause degeneration in the corpus striatum resembling parkinsonism.

3. *Cortical Degeneration.*—Degenerative lesions in the cortex may be due to rheumatic or Sydenham's chorea, and also to Huntington's chorea. The site of the lesions in rheumatic chorea is disputed, according to some authors the chief lesions being in the basal ganglia. Huntington's chorea is a chronic degeneration especially in the frontal lobes and motor cortex, closely resembling that of G.P.I. and also of the anterior portion of the lenticular nucleus. The disease usually commences about the age of thirty and causes irregular choreiform movements associated later with mental degeneration leading to dementia. It may be a family disease, but never skips a generation, as often occurs in Friedreich's disease.

The following two cases, father and daughter, illustrate the signs. The father, now an advanced case of the disease, first showed signs 17 years ago. His jerky choreiform movements and his almost inability to stand are noteworthy. He can talk rationally, though the articulation is ataxic and jerky, and his mentality is very defective in many ways, with a liability to explosions of temper and violence. The daughter, now 20, began to be unsteady and to drop things at the age of 15, and has gradually become rather fatuous; she is unsteady in gait, having been accused in the street of drunkenness. She can knit, but is unsafe with crockery; she can be trusted on errands and with money, but her mentality is childish for her age.

It has been stated that the symptoms develop later with succeeding generations, but in this instance the reverse is the case (what is called anticipation, a phenomenon often observed in hereditary chronic nervous diseases, including the insanities). It has been suggested that this progressively earlier appearance of the symptoms is an effort of the stock to cure itself of the disease taint, a race suicide.

Acute encephalitis may lead to monoplegia, hemiplegia, or diplegia when the disease is widespread and bilateral, and the irregular movements are then liable to be extremely coarse and widespread, while walking may be delayed until the tenth or twelfth year, and mental deficiency is also common when the frontal lobes are involved.

Senile and familial tremors may be closely related; there is no rigidity, only the tremor resembling that of parkinsonism which should usually be easy to distinguish. The prognosis however, both in familial and senile tremor, is hopeless as regards cure or checking.

4. It is only twenty-two years ago that the *corpus striatum* was shown by Kinnier Wilson to be the site of degenerative lesions associated with rigidity and tremor. Paralysis agitans or Parkinson's disease has been known for over a hundred years since his original description in 1817, but it is only of late years that Ramsay Hunt and others have assigned the site of its lesion in the pallidal region of the lenticular nucleus. This has not yet been so conclusively proved as in Wilson's disease, or progressive lenticular degeneration. Wilson demonstrated chronic degeneration in the putamen in several cases of this disease, which may be familial. These cases do not resemble Parkinson's disease at all closely, though the tremors and rigidity recall this disease. Characteristic signs are the spastic smile with mouth fixed open, the meaningless laughter, mental hebetude, and especially the associated atrophic cirrhosis of the liver. Allied to this disease is torsion spasm—a rare form of irregular slow spastic movements of head, trunk, and limbs. This disease differs from athetosis, a sequel of infantile hemiplegia or diplegia, in that in the latter the torsion spasms affect the limbs only.

Below the thalamus and adjacent to the substantia nigra, with both of which it has fibre connexions, is the hypothalamic nucleus, or corpus Luysii, lesions of which have been known to give rise to coarse spontaneous and severe choreiform movements of sudden onset.

Parkinsonism is a common sequel of encephalitis lethargica, and since the appearance of this disease in 1917, innumerable cases of parkinsonism have been seen in young adults and even in children. Many cases of young persons, as in the case of this patient to-day, give no history suggestive of acute encephalitis or severe influenza, but yet we believe them to be post-encephalitic in origin.

Previous to the war parkinsonism and paralysis agitans were extremely rare under the age of forty-five. The lesions in encephalitis lethargica are especially prone to affect the region of the substantia nigra, lying ventral to the thalamus, and possibly the

pallidal portions of the lenticular nuclei are also involved.

In a typical case of parkinsonism the mask-like expressionless face, the drooling of saliva, the slow deliberate movements with the varying tremor of the hands and feet may be observed. The gait is characteristically shuffling, the arms hanging by the sides and not swung, and slow turning movements such as a pair of tongs would make. When the patient is told to look at any object the eyes turn first, the head slowly following. The tremor is rhythmical when the limbs are at rest, but may cease for a few moments on voluntary effort. The head does not shake as in senile tremor unless the violence of the tremor in the arms is sufficient to shake the whole body. Mentality is scarcely affected, but the prognosis is one of relentless progress of the symptoms and of generally increasing feebleness.

The disease can be recognised at sight, even in the early stages by the mask-like expressionless face and the general stiffness of gait and loss of swinging of the hands, while the writing is often noticed to be very much smaller. Unless the clinical picture as a whole is taken in and recognised at once, the physician will often miss the diagnosis altogether.

Stramonium, hyoscine, and belladonna are the only drugs that give any relief.

Parkinsonism, like Wilson's disease, is due to an extrapyramidal lesion, and though increasing weakness and rigidity are produced, yet there is no true spasticity, and the deep reflexes are unaffected, and the plantar reflexes remain flexor.

5. Lesions of the *thalamus* are especially liable to produce disorder of sensation on the opposite side of the body, as the thalamus is a relay station for all the sensory fibres ascending from the spinal cord and cranial nerves. Those concerned with tactile and postural sensations are mostly relayed to the parietal cortex, but pain, heat, and cold sensations mostly end in the thalamus. Lesions may cause partial crossed hemi-anæsthesia, especially to pain and temperature, together with slight hemiplegic weakness without rigidity, but accompanied by tremor. These latter symptoms are due to the loss of the normal efferent impulses from the thalamus proceeding via the red nucleus and rubro-spinal tract to the lateral columns of the cord. Often there is a hemiplegic sensation of discomfort, or even spontaneous pains, and that side of the body may react more to strong, sensory impulses and to emotional disturbances. This group of symptoms of slight hemiplegic weakness, analgesia and tremor, with spontaneous pains, is sometimes known as the thalamic syndrome, described by Dejerine and Rousseau.

6. *Cerebellar* lesions, tumour, hæmorrhage or thrombosis, encephalitis, or even chronic degenerative lesions, usually produce marked incoördination of movement on the same side of the body, due to the loss of the governing quality of the cerebellar cortex upon muscular movements. The intense ataxy and loss of sense of position of the body in space is sometimes extremely marked in cases of thrombosis of the posterior inferior cerebellar artery. In addition to the usual crossed sensory loss on the face of the same side and of the opposite half of the body below the level of the fifth cranial nerve, static and locomotor ataxy may be intense, and the patient may require many months of gradual practice before he can walk at all properly.

I have known cases at the commencement to feel completely reversed in space for some hours; one man who was taken suddenly ill in his bathroom having to hold on firmly to the sides of the bath to prevent himself falling down on to the ceiling, from which he could see the electrolier sticking up vertically towards him. Another man, after admission to hospital, described his sensations as though all the beds in the ward were stuck like flies to the ceiling, while the ceiling loomed dangerously underneath him.

In the ataxy of cerebellar disease the limbs grope for their objective unsteadily, and the gait is lurching or reeling, especially towards the side of the lesion. The ataxy is not increased by closing the eyes, as in tabes, nor is there any loss of sense of position of the joints. The arms share in the general ataxy in cerebellar disease, with irregular incoördinated movements. Nystagmus, an ataxy of eye movements, is often present, and there is a slowness of producing and arresting repetitive movements, such as pronation or supination of the hand, named by Babinski adiadokokinesis.

It must not however be imagined that the diagnosis of cerebellar lesions is as easy as this description might suggest. Although acute and sudden lesions of the cerebellum will almost certainly produce symptoms resembling those I have described, yet, in chronic lesions such as tumour, it is frequently observed that even large tumours of one lateral lobe or even of the vermis are sometimes unaccompanied by any ataxy, nystagmus, or other of the well-known cerebellar signs.

Hereditary Ataxy.—A group of closely allied diseases, known as the hereditary ataxias, is associated with degeneration of the cerebellar afferent tracts in the spinal cord, and occasionally with some atrophy of the cerebellum itself.

A case of Friedreich's disease illustrates a disorder of coördination of the muscles of the limbs, trunk, head, speech, &c., due to a primary atrophy or sclerosis of afferent cerebellar tracts. The incoördination of movement is cerebellar in type and is not increased by closing the eyes, as in tabes, nor is there any loss of sense of position of the joints, or cutaneous anæsthesia. As in tabes, there is loss of the knee-jerks and other deep reflexes, but the plantar reflexes are extensor, owing to the additional sclerosis of part of the crossed pyramidal tracts. The direct cerebellar tract is atrophied and also the cells of Clarke's column, which are its nuclei of origin. The dorsal columns show considerable atrophy, especially that of Goll, or the median dorsal columns, and the posterior roots also to some extent. Hence there is coarse ataxy with loss of deep reflexes and extensor plantars. The patient reels and staggers like a drunken man and his speech is indistinct and explosive, while choreiform tremors are visible in the facial muscles and limbs. Kyphoscoliosis is a common symptom and also a definite tendency to pes cavus and the arching of the feet with dorsiflexion of the great toes when walking. The ataxy of the arms differs from the intention tremor of disseminated sclerosis in the coarse movement at the commencement in this disease, while in disseminated sclerosis the incoördination becomes wilder as the movement progresses. The disease runs a very chronic course and may last 30 or 40 years, ultimately considerable muscular wasting and some anæsthesia appearing. Mentality is unaffected and the eyes do not suffer, except occasionally with nystagmus. Severe pains are sometimes met with, as in this patient, and even gastric crises have been described. I saw these crises myself with Argyll Robertson pupils in a girl of otherwise typical Friedreich's disease, who was the niece of another patient of mine with Sanger Brown's variety of hereditary ataxy. This latter group may develop optic atrophy and squints, and even Argyll Robertson pupil, with mental degeneration.

Many forms of hereditary ataxy have been described, of which Friedreich's is the best defined group. Others show increased knee-jerks and ankle-clonus and no scoliosis, but with optic atrophy and squints. Another fairly well-defined group is known as hereditary spastic ataxy, in which the syndrome is more of a spastic paralysis than ataxy. The lesion in all is somewhat

similar, the spinal cord being notably small, with the chief atrophy being found in the dorsal and cerebellar tracts. This is a form of abiotrophy, a premature senescence of certain nerve tracts, due to congenital fault in development, and not to any extrinsic factors, though possibly excessive alcoholism in the parent is a factor, as Friedreich originally insisted.

Group 7, spinal disorders was dealt with earlier in the paper.

8. The last group contains one type only, *clonic facial spasm*. It is true that some clonic facial spasms are of cortical origin and are then allied to the tics, but the type I am referring to here is due to some nutritional disturbance either in the facial nucleus or irritation of the nerve trunk itself. Many cases are a sequel to an incomplete Bell's palsy, or facial paralysis, which has partially recovered. In the recovery, such contracture gradually develops, so that the naso-labial fold and other creases of the face become intensified, but at the same time in many cases clonic twitching of the face develops on that side. I have seen this follow partial recovery and contracture after wounds of the facial nerve in the parotid region, as well as in the commoner type of Bell's palsy which is probably due to acute genicular neuritis, or after middle-ear disease. Facial paralysis is alone amongst lesions of the peripheral nerves, in which clonic spasm of the musculature is a sequel to partial recovery.

INDIVIDUAL VARIATION IN THE RESPONSE TO DRUGS*

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The variability of patients in their response to drugs is a fact well known by every practitioner of medicine and hence any discussion of this variation may seem somewhat superfluous. I believe, however, that it is worth while attempting to make a quantitative estimate of its extent, because although all practitioners know that every patient presents a separate special problem in regard to treatment, yet it is only possible to determine the extent of the variation by making carefully controlled observations on large numbers of patients. Laborious work of this type is seldom undertaken and in its absence there is a natural tendency to class responses which only deviate slightly from the normal as examples of variation but to treat responses which vary widely as "accidents" due to some unknown cause.

The study of variation shows, however, that if a moderate deviation from the average occurs commonly, then occasionally one will meet individuals that vary very widely indeed. There has been a tendency in recent years to try to accelerate certain forms of treatment by giving massive doses of drugs. For example, Eggleston in 1915 introduced an intensive method of digitalis therapy which consisted of calculating the total quantity of drug needed to digitalise the patient, and giving half this quantity at once, another quarter six hours later, and the remainder in subsequent smaller doses. Such methods can only be safe if there is no wide individual variation in the response of patients to drugs, and hence it is of interest to try to determine the range of variation in response that may be expected.

It is essential that any method of treatment should be reasonably safe ("Il est mort guéri" is not a satisfactory conclusion to a course of treatment) and although it is difficult to define the degree of safety that may reasonably be demanded, yet I think that most practitioners would agree that a method of treatment that involved an unavoidable chance of one death in 1000 cases was too dangerous for clinical use, and that the chance of death should be less than one in 10,000. The first problem therefore is to try to deduce from the data available the probable relation between the dose of a drug that usually produces toxic effects and the dose that will not produce toxic effects even once in 10,000 cases. There is a considerable mass of data regarding variation in response to drugs, and in some cases the numbers of animals used amount to as many as two or three thousand.

An estimate of the chance of a dose producing an occasional death can be made as follows. A characteristic curve is constructed showing the relation between dosage and percentage mortality. The standard deviation in symmetrical curves is equal to the difference between the doses killing 16 per cent. and 50 per cent. of the population. The latter dose is termed the median lethal dose. A dose equal to the median lethal dose less 3·7 times the standard deviation will probably kill not more than one individual in 10,000.

TWO IMPORTANT FACTORS

Two facts of outstanding importance must be recognised. First, the amount of scatter in the response to drugs varies enormously in the case of different drugs. For example, the responses of animals to ouabain and digitalis are very constant, whilst the response to dysentery toxin varies over a huge range. Consequently the variation in response observed with one drug gives no certain indication of the amount of variation that will occur with another drug. Secondly, the amount of variation depends on the population. For example, an inbred population of mice gives a much more uniform response than do ordinary stock mice. The following figures[1] show the kind of differences that may occur.

Dose of neoarsphenamine as percentage of mean dose.	Percentage mortality in— (*a*) stock mice.	(*b*) inbred mice.
100	50	50
66	16	5
50	10	0
33	5	—
25	2	—

Human patients vary in every respect, and there is no chance of their response showing a uniformity at all comparable with that given by carefully selected, inbred animals, and the human response will indeed probably show a greater rather than a less variation than does the response of ordinary stock laboratory animals. Provided that this fact is always borne in mind, it seems justifiable and interesting to see what indications animal experiments provide regarding the probable safety of various methods of massive dosage of human patients.

A certain amount of information is available regarding two important drugs used in this manner—namely, digitalis and neoarsphenamine.

Massive digitalis therapy.—The figures relating to dosage of digitalis and mortality in frogs and cats show remarkably little variation in response. They indicate that a dose equal to half the mean toxic dose

* Abstract of a communication made to the Medico-Chirurgical Society of Edinburgh on Nov. 7th, 1934.

[1] Taken from Durham, F. M., Gaddum, J. H., and Marchal, J. E.: Med. Research Counc., Spec. Rep. Series No. 128, 1929.

would not produce death once out of 10,000 animals. Digitalis is, of course, given to patients whose hearts are affected to a variable extent by disease and hence patients are likely to show a far wider variation in response than do healthy animals. The results of the animal experiments are, however, encouraging, since they show that digitalis may be classed amongst the drugs which have a relatively uniform action when tested on large populations.

Neoarsphenamine.—The results obtained with 1330 inbred rats (Morrell and Chapman, 1933) show that a dose equal to 47 per cent. of the mean lethal dose would kill only one individual in 10,000, whilst the results of Durham, Gaddum, and Marchal (1929) with inbred mice suggest that 40 per cent. of the mean lethal dose would kill one individual in 10,000. The results of the latter workers with ordinary stock mice showed however wider scatter; one death in 20 mice was actually produced by a dose which was only one-third of the mean lethal dose, and the general slope of the curve suggests that one-sixth of the mean lethal dose would produce one death out of 10,000 animals. Diseased human beings are likely to vary even more than ordinary healthy stock mice, and these results suggest that the therapeutic dose of neoarsphenamine should not be more than one-tenth of the mean lethal dose.

The extent of individual variation in response to drugs was not generally realised twenty-five years ago, and it is evidence of Ehrlich's genius that he was so careful to find substances with a high therapeutic ratio before introducing them into clinical use.

LETHAL DOSAGE

Animal experiments show that if every care is taken to obtain as uniform a set of rats as possible and if a drug be given in dosage calculated according to body-weight in an absolutely uniform manner, then in the case of most drugs if a dose of one unit kills 1 per 1000, a dose of at least four units will be needed to kill all the other animals. It is very rare to obtain a more favourable result than this; and with many drugs there is a sixfold difference between these doses; and in some cases the range is far greater—e.g., dysentery toxin. All workers in this field have found that results as favourable as those mentioned can only be obtained with inbred stock of similar age and sex. It therefore is probable that in the case of human beings in health there is at least a fivefold difference in the lethal dose for susceptible and resistant individuals.

Our knowledge of lethal dosage in human beings is very scrappy and inexact, but in the case of poisons commonly used for suicide, such as barbitone, there is a certain amount of evidence. In this case the smallest fatal dose reported is between 1 and 2 g., the largest dose reported to have been survived is 24 g., whilst a dose of 10 g. is nearly always fatal. These results show about a sixfold variation between the smallest recorded and the usual lethal dose.

A study of the evidence sometimes given in legal cases regarding lethal doses indicates that the extent of individual variation is not adequately recognised, since one sometimes finds dogmatic statements that such and such is the minimum lethal dose of a poison. The term minimum lethal dose really has very little meaning and we ought to speak either of the lowest dose that is recorded as having produced death or else of the dose that is usually fatal.

IDIOSYNCRASY

The examples of individual variation discussed hitherto have been cases where there has been less than a tenfold difference in the dosage needed to produce the same effect on the least susceptible and the most susceptible individual in a population. There are cases, however, in which the variation is spread over a much greater range. The action of dysentery toxin on mice is an example of this type, and in this case some individuals survived a dose 30 times the amount sufficient to kill the most susceptible individuals. A variation of this extent raises the question as to whether what we term a case of idiosyncrasy is merely a case falling at the extreme end of a curve of individual variation. The term idiosyncrasy can however be used with safety when a drug produces a wholly abnormal type of response. For example, acetyl-salicylic acid produces a certain amount of gastric irritation in many persons, and some individuals are much more susceptible than others, but probably a sufficiently large dose of the drug would produce this effect in most individuals. This is a clear example of individual variation in response shown by the general population. On the other hand in the case of about one person in 10,000, quite a small amount of acetyl-salicylic acid may produce a general urticaria which is a wholly abnormal response that could not be produced in the rest of the population by any dose of the drug. This qualitatively abnormal response may suitably be termed idiosyncrasy.

Dr. G. H. Percival[1] made some interesting studies regarding the individual variation in the response of patients to skin irritants. He found that the mean concentration of mercuric iodide and chloride which produced irritation in a group of patients was one part in 3000 but that certain individuals responded to a concentration of one part in 100,000, whilst others were not affected by one part in 1000. This systematic study showed a continuous variation in susceptibility extending over a hundredfold range in concentration and hence the very susceptible individuals were not really examples of idiosyncrasy, although if met with casually they would probably be classified as such.

SURGICAL ANATOMY OF THE ANAL CANAL

WITH SPECIAL REFERENCE TO ANORECTAL FISTULÆ

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THOUGH incontinence of fæces after surgical treatment of fistula-in-ano is nowadays rarely seen, *unhealed fistulæ* following surgical treatment are by no means uncommon. There are various reasons why the fistulæ remain unhealed. Sometimes the surgeon has not succeeded in discovering the main track of the fistula into the anal canal; on other occasions he may have shown operative timidity in estimating the amount of sphincter ani that can be safely cut, or in deciding the amount of muscle that can be left and be relied upon to function successfully and maintain continence. For these reasons we were stimulated to present this work.

Muscles of the Anal Canal

SPHINCTER ANI EXTERNUS

The external sphincter of the anus is a trilaminar muscle which together with the puborectalis portion

[1] Brit. Jour. Dermat., 1933, xlv., 49.

FIG. 1.—Diagrammatic representation of the portions of externa sphincter ani. Note: the vertical levels of the various parts cannot be shown; for this see vertical section (Fig. 2).

of the levator ani forms a strong muscular cylinder encircling the longitudinal muscle, the internal sphincter ani and, below this level, the anal canal. It consists of layers of superimposed fibres, and in its most differentiated form three portions are distinguishable (Figs. 1 and 2). In some cases there are only two separate portions—the two deeper layers being then inseparable. The three layers are named from below upwards:—

1. Sphincter ani externus subcutaneus.
2. ,, ,, ,, superficialis.
3. ,, ,, ,, profundus.

The first and third portions are annular muscles not attached to the coccyx, and supplied by the inferior hæmorrhoidal nerve from the third and fourth sacral nerves. The second portion is elliptical in shape, attached to the coccyx, and supplied by the perineal branch of the fourth sacral nerve. Fibromuscular septa, prolongations of the longitudinal muscle of the rectum lie between the three portions. The first portion situated below and in the same plane as the internal sphincter surrounds the anal canal alone. The second and third parts encircle the longitudinal muscle and internal sphincter ani (Fig. 2).

(1) *Sphincter ani externus subcutaneus.*—This muscle is an annular band directly encircling the lowest portion of the anal canal (Fig. 9). It is easily seen and felt beneath the skin of the anus and lies in the same plane as the internal sphincter, from the lower border of which it is separated by an annular band of fascia, the *anal intermuscular septum*. Posteriorly the fibres do not reach the coccyx, but decussate freely with their fellows of the opposite side. Anteriorly the fibres also decussate, but a few unimportant strands may be traced in dissections into the scrotum forming a rudimentary retractor scroti. In the female this part of the muscle is well developed, and a few fibres may become continuous with the sphincter vaginæ of the same and opposite sides.

(2) The *sphincter ani externus superficialis* is an elliptical muscle lying between the subcutaneous sphincter ani below, though on a more lateral plane, and the deep part of the sphincter ani externus above (Figs. 1 and 2). Fibromuscular septa, prolongations of longitudinal muscle intervene between these portions. The superficial external sphincter surrounds sphincter ani internus in its middle and lower part

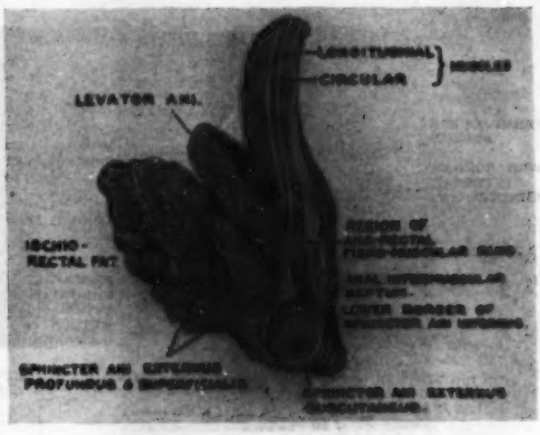


FIG. 2.—Vertical section of anal canal. (Specimen removed at operation; therefore foreshortened.)

as well as the intervening downward anal prolongation of longitudinal muscle of the rectum. This muscle is the only layer of the sphincter ani externus attached to the coccyx, and is therefore referred to as the coccygeal part of the sphincter ani externus. This attachment to the vertical column represents the primitive arrangement of the whole of the sphincter ani externus. In the case of the other two parts the caudal attachment has disappeared.

Posteriorly the muscle arises mainly by aponeurotic and muscular fibres from the dorsal aspect of the terminal piece of the coccyx, and also from the ano-coccygeal raphe. The muscle divides into two halves which become broader as they pass forwards embracing the

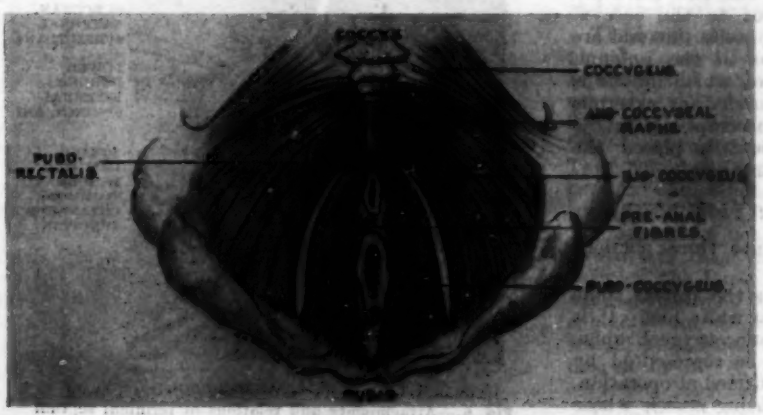


FIG. 3.—Diagram of levator ani (sphincter muscles not shown).

sphincter ani internus and longitudinal muscle. Anteriorly the fibres are chiefly inserted into the central point of the perineum, but some fibres pass superficially to the skin, some are continuous with the bulbocavernosus or sphincter vaginæ, and not infrequently fibres extend outwards to the tuber ischii.

(3) The *sphincter ani externus profundus* (Figs. 1 and 2) is the upper division of the external sphincter ani, and consists of an annular band of some thickness, in contiguity with the puborectal fibres of the levator ani in the posterior half of its circumference. Its upper margin is not defined, except in its anterior half, for the posterior fibres intermingle with those of the puborectalis. The lower margin is in close contact with the sphincter ani externus superficialis, but sometimes separated from it by a fibrous septum, a prolongation of the longitudinal muscle. The sphincter ani externus profundus encircles the anal prolongation downwards of the longitudinal

FIG. 4.—Diagram of levator ani (lateral view).

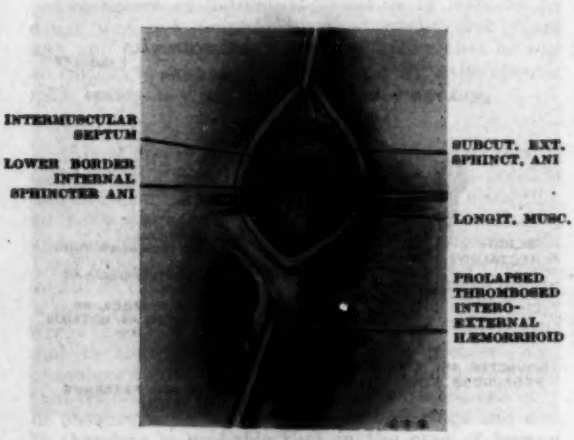


FIG. 5.—Relationships and terminal attachments of longitudinal muscles of anal canal.

muscle of the rectum and the upper part of the internal sphincter ani, in this order from without inwards. Behind the rectum the fibres of the two sides are continuous, having no attachment to the coccyx. Anteriorly the fibres pass to the opposite side and are attached to the ascending ramus of the ischium, representing the transversus perinei, which muscle is closely connected with the sphincter ani externus profundus. Other fibres pass uninterruptedly to the opposite side, while in their midst is placed the fibrous tissue constituting the perineal body.

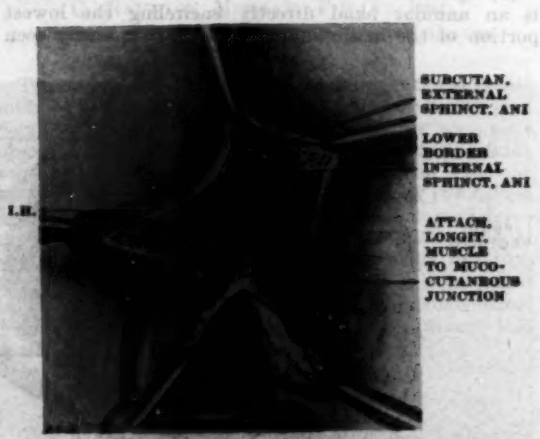
THE LEVATOR ANI

This muscle may be divided into three portions (Figs. 3 and 4).

1. The *iliococcygeus* arises from the ischial spine and from the posterior part of the white line. It is inserted into the coccyx and the anococcygeal raphe. It is usually thin and may only be represented by fibrous tissue, a fact repeatedly confirmed at operation. It must be regarded as a degenerating muscle whose primary function, flexor of the tail, has been lost. It has no physiological connexion with the rectum and anal canal. An accessory slip of the posterior portion, because of its attachments, is sometimes named the *iliosacralis*.

2. *The pubococcygeus.*—These fibres arise from the back of the pubis and from the anterior part of the obturator fascia, and are directed backwards almost horizontally along the side of the rectum, at a higher level than the puborectalis. The muscles of the two sides join behind the rectum and form a dense raphe, lying on that formed by the iliococcygeus. This portion of the muscle exerts no influence on the rectum.

3. *Puborectalis.*—This muscle, so important in rectal function, arises from the back of the lowest part of the symphysis pubis under cover of the pubococcygeus and from the upper layer of the triangular ligament, as well as from the pubis immediately adjacent to the symphysis. From this origin the fibres pass backwards and also downwards around the lower and lateral aspect of the rectum, meeting with fibres from the opposite side behind the anal canal, so forming a powerful loop or girdle, which slings the anorectal junction to the symphysis pubis. None of these fibres reach the coccyx. In man they have been profoundly modified. They have lost their attachment



I.H.=INTERN. HÆMORRHOID.

Fig. 6.—Attachments and relations of terminal septum longitudinal muscle.

to the caudal vertebræ and have come into close contact with the rectum. Holl refers to the puborectalis muscle as the best developed muscle in the pelvic diaphragm—a fact convincingly demonstrated during perineal excision of the rectum and clinically confirmed by palpation. Its lower border is intimately attached to the external sphincter ani profundus (Fig. 2). Between these sling fibres and the anal canal are the downward prolongations of the longitudinal muscle of the rectum and the sphincter ani internus. A few weak interlocking muscular fibres cross in front of the anal canal. The puborectalis lies at the junction of the rectum and the anal canal, and is a well-defined locality which can be identified with the trained examining finger (Fig. 13).

The levator ani is supplied by: (1) a branch of the fourth sacral nerve to the pelvic surface, representing the tail portion; and (2) branches of the internal pudic from the third and fourth sacral to the external surface, representing the sphincter portion.

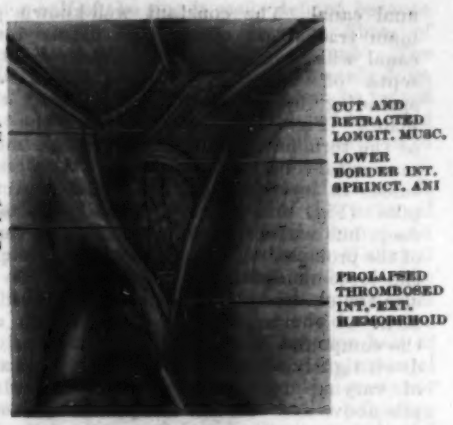

SUBCUT. EXT. SPHINCT. ANI
SUBMUCOSA WITH SUP. HÆMORR. VESSELS
CUT AND RETRACTED LONGIT. MUSC.
LOWER BORDER INT. SPHINCT. ANI
PROLAPSED THROMBOSED INT.-EXT. HÆMORRHOID

FIG. 7.—Relationships of longitudinal muscle of anal canal to hæmorrhoids and sphincters.

becomes fibromuscular, blending in its posterior half with the puborectalis which lies exteriorly and also with the external sphincter ani profundus in its anterior half, where the puborectalis has left the anal canal. It thus takes its share in the formation of the *anorectal ring*. In dissections it can then be traced downwards enveloping the sphincter ani internus, but in its turn it is embraced by the deep and superficial external sphincter in this order.

FIG. 8.—Left thrombosed intero-external hæmorrhoid. Retractor opens up sulcus due to attachment of longitudinal muscle.

FIG. 9.—Showing subcutaneous external sphincter encircling anus.

FIG. 10.—Showing lower border of internal sphincter. Subcutaneous sphincter ani externus retracted with finger.

THE LONGITUDINAL MUSCLE OF THE ANAL CANAL

This muscle is the prolongation of the external muscular coat of the rectum surrounding the anal canal. At the upper end of the anal canal it at once

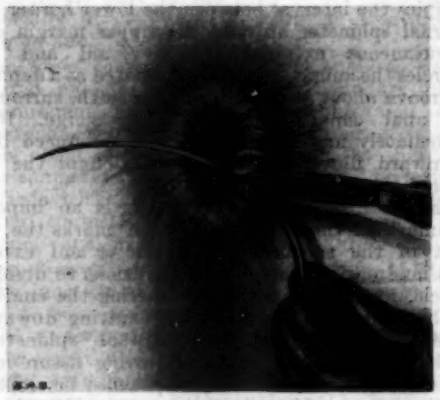


FIG. 11.—Technique of division of subcutaneous external sphincter. Needle is inserted at the outer border of muscle and emerges at intermuscular septum.

The longitudinal muscle ends by dividing into two or sometimes into three fibromuscular septa, which separate and ensheath the various portions of the external sphincter ani. The septum between the deep and superficial external sphincter, if present, traced outwards becomes lost in the ischiorectal fat. That below the superficial external sphincter is also lost in the ischiorectal fat, but obviously more superficially than the previously described septum. The septum, which is a continuation of the muscle downwards, has important connexions. It passes between the lower border of the internal sphincter ani and the upper border of the subcutaneous external sphincter ani, forming the *anal intermuscular septum* which is attached in a narrow or sometimes broad ring to the skin of the anus in the region of the mucocutaneous junction (Figs. 5–7).

It may here be mentioned that the insertion or termination of the longitudinal muscle has an interesting bearing on the pathology and surgery of the

anal canal. The constant well-known positions of main tracks and openings of fistulæ into the anal canal will be seen to have definite relations to the septa of the longitudinal muscle, suppuration spreading by direct extension along these tissue planes (Fig. 15). Furthermore, the attachment of the termination of the longitudinal muscle to the mucocutaneous junction explains the presence of the sulcus in intero-external prolapsed and thrombosed piles (Fig. 8). This sulcus in some cases is ¼ in. deep, but varies in depth according to the "degree" of the prolapse. The extravasated blood clot distends the loose mucous membrane of the pile above and also the elastic subcutaneous tissue below the attachment of the muscle. The intervening covering of the compound and thrombosed prolapsed pile is held down tightly by the longitudinal muscle and a sulcus of varying depth between the distended internal pile above and the external pile below results.

W. S. Perrin has pointed out that in non-prolapsing internal hæmorrhoids ("first degree") there is a firm subjacent attachment with a groove at the muco-cutaneous junction, fixing, as it were, the hæmorrhoid at this point and thus preventing prolapse. This is the cutaneous attachment of the longitudinal muscle of the anal canal. It has been observed in dissected specimens obtained by perineal excision of the rectum, demonstrated in cases of thrombosed intero-external prolapsed piles and also during the operation of hæmorrhoidectomy in piles of the second and third degree. Microscopic sections of the fibro-muscular attachment have been prepared and examined by Dr. Cuthbert Dukes.

Reference to the drawings (Figs. 5–7) will show the relationship of the terminal septum of the longitudinal muscle.

In our opinion it can have little, if any, practical bearing on the causation of stricture formation following the "stripping-up" and similar operations for hæmorrhoids. Yet it is worthy of note that if the incision or groove for the ligature is made in the mucous membrane, the muscle attachment lies below and is not included in the ligature, but should the incision at the base of the pile be made through the skin into the subcutaneous tissue the inter-muscular septum is included in the strangulating ligature.

I.S. = INTERMUSCULAR SEPTUM.

FIG. 12.—Palpation of intermuscular septum. Middle of distal phalanx at level of anus.

P.A. = POSTERIOR PART OF ANORECTAL RING.

FIG. 13.—Palpation of posterior part of anorectal ring. Proximal interphalangeal joint at level of anus.

FIG. 14.—Palpation of anterior part of anorectal ring. Middle of second phalanx at level of anus.

SPHINCTER ANI INTERNUS

The *sphincter ani internus* (Fig. 2) is a tubular or cylindrical muscle encircling almost the whole length of the anal canal. Its well-defined, somewhat thickened, and easily palpable lower edge just falls short of the lower end of the anal canal, which canal is completed in this plane by the subcutaneous external sphincter ani below (Fig. 10). The fascial anal intermuscular septum intervenes between these two muscles. The sphincter ani internus is a direct continuation of the circular muscle wall of the rectum into the anal canal. Though the circular coat is much thicker in the anal canal, it does not form a narrow annular band or ring so often depicted in diagrams. Nor is it the sole guardian of continence. The *composite anorectal ring* has this important function. The inner surface is covered with mucous membrane separated from it by the submucosa, in which run the hæmorrhoidal vessels. The outer surface from above downwards is separated by the ensheathing thin fibromuscular prolongation of the longitudinal muscle from the puborectalis, the external sphincter ani profundus, and the external sphincter ani superficialis.

The *anal intermuscular septum* (Figs. 2 and 12) occupies the interval between the lower border of the internal sphincter ani and the upper margin of the subcutaneous external sphincter ani and hence encircles the anus. It is easily palpated as a depression or groove about ¼ in. to ½ in. in breadth, surrounding the anal canal just inside the verge. It lies immediately under the skin and is produced by the downward fibromuscular prolongation of the longitudinal muscle of the rectum.

The anal intermuscular septum is an important landmark in the anal canal, for it marks the upper limit of the subcutaneous sphincter ani externus. This landmark is helpful in operations to divide the muscle, for a tenotomy knife entering the anal canal at this point from without and cutting downwards divides the subcutaneous external sphincter in conditions of tight anus or recurring fissure-in-ano, or, as in Fig. 11, a needle technique may be employed.

It is at the anal intermuscular septum that the main track of most fistulæ reaches the submucosa and either travels up the anal canal submucously superficial

to the muscles or actually perforates the mucous membrane and enters the anal canal at this point. Fissures of the mucous membrane overlie the subcutaneous external sphincter ani and the intermuscular septum, but rarely extend above this level.

This anatomical description is based on dissections, sections of anal canals removed at operation, clinical and surgical observations, all stimulated by the excellent monograph, "The Myology of the Pelvic Floor," by the late Peter Thompson, to whose work we would humbly and admiringly pay our tribute, and gratefully acknowledge our indebtedness. Prof. H. H. Woollard has given us invaluable advice and encouragement.

Palpation and Recognition of the Anal Musculature

The *sphincter ani externus subcutaneus* (Figs. 2, 9, and 10) is easily palpated and recognised in its whole extent as a round or occasionally elliptical band situated at the anal verge immediately under the skin. It is about a quarter of an inch in thickness. The lower and outer margin can be definitely felt under the skin and is related to the elastic and pliable ischiorectal fat of each side. At its upper and inner edge, equally definite to the touch, there is a well-marked depression, a quarter to an eighth of an inch wide encircling the canal called the *anal intermuscular septum*. This separates the muscle from the easily recognised lower rounded edge of the internal sphincter which itself reaches to within a quarter of an inch of the anal verge. The sphincter ani externus subcutaneus is the only part of the external sphincter, which is subcutaneous and directly palpable throughout. It is unessential as far as sphincteric function is concerned and can be safely divided in any direction or cut away in any manner, the patient being unconscious of the loss. Indeed, much benefit follows the deliberate division of this muscle when a tight anus is associated with troublesome symptoms. It is often erroneously referred to and diagrammatically drawn as the whole of the sphincter ani externus. In the majority of cases the main track of fistulæ runs into the anal canal in close relation to this muscular bundle, either below and subcutaneously, or above and through the intermuscular septum (*low level anal fistula*) (Fig. 15 A), thus separating the subcutaneous portion of the muscle from the rest of the external sphincter and internal sphincter lying above. So it is frequently divided by the surgeon in dealing with fistulæ. This muscle forms part of the base of the ulcer and is beneficially divided for the surgical treatment of fissure-in-ano.

The *lower border of the internal sphincter* can be palpated as the rounded upper boundary of the intermuscular septum encircling the anal canal. It extends below the muco-cutaneous junction to within about a quarter of an inch of the anal verge. If the sphincter ani externus subcutaneus be retracted outwards with the finger, the lower border of the internal sphincter can be demonstrated as it closes the anal canal in its lower part (Fig. 10).

The *anorectal ring*, as its name implies, is situated at the junction of the anal canal and rectum. It is found to be a composite fibromuscular band composed of the upper portion of (*a*) the internal sphincter, (*b*) the longitudinal muscle, (*c*) the puborectalis, and (*d*) the external sphincter ani profundus muscles. The palpating finger in the anal canal by withdrawing and inserting with pressure at this point should identify this ring with precision (Figs. 13 and 14). The posterior half of the ring is easily defined because of the participating prominent sling-like fibres of the puborectalis portion of the levator ani. The puborectalis, if followed forwards and upwards from behind with the rectal palpating finger, can be traced leaving the anorectal ring on each side of the anal canal to find insertion into the posterior surface of the pubic bones near the symphysis pubis.

The internal sphincter and the longitudinal muscle surrounded by the deep portion of the external sphincter encircle the anterior half of the bowel and here complete the ring. An anterior U-shaped deficiency is left by the departing limbs of the puborectalis sling. The internal and deep external sphincters here cannot be felt as separate muscles, but as a composite flat band. The anterior half of the ring, with the upper border of the deep external sphincter, though not so distinct as the posterior half of the ring, can be detected with the palpating finger and often confirmed by simultaneous bidigital palpation of the rectovaginal septum through vagina and anal canal. It should be pointed out that the sphincter ani internus can only be recognised apart from other sphincter muscles at its lower edge near the anal verge. It lies, however, immediately under the mucosa and is palpated along almost the whole length of the anal canal.

On withdrawing the long tubular rectal speculum from the air-distended rectum to the anal canal, the anorectal ring contracts as the end of the speculum reaches the junction, and a narrow ring of mucous membrane appears. The highest portion of the internal hæmorrhoidal plexus lies just above the anorectal ring and therefore, in the sclerosing treatment of hæmorrhoids, the needle should be inserted into the submucosa at or just above the level of the ring, where the mucous membrane is insensitive to painful stimuli.

It is suggested that the whole of the external sphincter is rarely cut in the treatment of fistula. Where continence remains, only the subcutaneous sphincter with sometimes the superficial, and perhaps a portion of the deep part, are divided. So intimately is the deep portion of the external sphincter connected with the puborectalis muscle that it would be difficult deliberately to cut the former without injuring the anorectal ring upon which control depends. In the anterior half of the anorectal ring the deep external sphincter alone stands as the last guardian of continence.

In complete rupture of the perineum in women the anterior part of the anorectal ring is completely severed and loss of control results, the posterior part of the ring together with the puborectalis often remaining intact. It is a matter of common experience to the proctologist that he can be less bold with division of sphincter muscles in the anterior half of the circumference of the anal canal, because of the shortness of the anal canal in front. This is due to the absence of the sturdy puborectalis in this part of the composite anorectal ring. Fortunately for their successful surgical treatment "high" level fistulous openings into the anal canal are usually situated in the posterior half of its circumference.

For the confident and successful surgical treatment of fistula-in-ano, one must be practised and skilled in palpating and recognising the anorectal ring, for whereas, if this ring be cut, loss of control surely results, yet as long as the narrowest complete ring of muscle remains, control is preserved. All the anal sphincter muscles below this ring may be divided in any manner without harmful loss of control.

ANAL MUSCULATURE WHICH CAN BE PALPATED AND RECOGNISED

1. Subcutaneous external sphincter ani throughout its whole extent.
2. Anal intermuscular septum.
3. Lower border of internal sphincter ani.
4. Anorectal fibromuscular ring.
5. Upper border of sphincter ani externus profundus (anterior half of anorectal ring).
6. Puborectalis muscles throughout their whole extent.

The palpation and recognition of the above structures in the normal rectum equips the operator with assurance and confidence in the surgical treatment of the pathological conditions affecting this part.*

(To be concluded)

RETROPERITONEAL HERNIA

AN ACCOUNT OF TWO CASES

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Records of retroperitoneal herniæ are still uncommon enough to make cases worth reporting. Further, the variation in clinical manifestations, in preoperative diagnosis, in anatomical arrangement, and in possible methods of radical treatment is of considerable interest to the surgeon.

It appears that as long ago as 1742 Neubauer described a case of paraduodenal hernia; in 1844 Hüschè, in 1857 Treitz, and in 1871 Landzert put the anatomy of peritoneal fossæ in the neighbourhood of the duodeno-jejunal fossæ on a sound basis; and in 1861 Klöb described a case of internal hernia in this region in detail. Since that date there have been sporadic reports in the medical press of isolated cases, accompanied occasionally by a summary of reported cases to date. But the standard work on the subject is Lord Moynihan's monograph,[1] the second edition of which was published in 1906, and the classification there adopted by him is still adhered to. Apart from fossæ in the duodeno-jejunal region, of which he describes nine, mention is made of pericæcal fossæ, intersigmoid fossæ, and the lesser sac of the peritoneal cavity.

The only reasonable ætiological theory of these fossæ seems to be that they represent a partial failure in the normal developmental process known as zygosis—i.e., that they are essentially "pre-formed sacs," due to a local fusion anomaly during the usual rotation of the gut.

Recent summaries of cases of retroperitoneal hernia differ rather widely in the total reported to date (it seems to be about 200), but there is no doubt that the fossæ in the periduodeno-jejunal region account for the large majority of internal herniæ. The two cases reported herewith come into this category.

CASE REPORTS

Case 1.—A well-built young male, aged 25, single, was admitted to St. Mary's Hospital in the afternoon of June 16th, 1933. He had had a sudden attack of acute abdominal pain at noon of that day, accompanied by violent vomiting. When first seen he stated that the pain had decreased very little in severity since its onset and he was retching constantly, bringing up small amounts of bile-stained watery fluid. Except for so-called "nephritis" two years previously there was nothing of note in his history, and definitely no story of indigestion of any sort.

On examination he was obviously shocked, pale, sweating, and restless. His temperature was 96·8° F.; pulse-rate 76, respiration-rate 20. There was retching every few minutes. The abdomen was retracted, with marked muscle guard over the whole anterior aspect. Tenderness was chiefly supra-umbilical; there was slight dullness on percussion in the epigastrium and right hypochondrium, and a limited area of hyperæsthesia in the latter region. Rectal examination was negative, as was that of the chest. Urine normal.

A diagnosis of high intestinal obstruction (? cause) was made and laparotomy carried out at 6 P.M. on the same day—i.e., six hours from the onset. A 4-in. right paramedian incision was made under general anæsthesia, the rectus abdominis retracted laterally, and the peritoneum opened. A distended stomach and duodenum presented, there being no sign of any ulcer in this area. No free fluid in the peritoneal cavity. About 4 in. of proximal jejunum were also found distended and immobile and beyond this a further 6 in. or so of small intestine were found packed into a paraduodenal fossa. This fossa looked to the right and downwards and had a well-marked upper and left lateral concave border. The gut was withdrawn with little difficulty from this pocket (which appeared to extend upwards into the base of the transverse mesocolon), and though showing a definite early constriction ring where it had been pressed on by this upper and left lateral sickle-shaped border, was of good colour and lustrous. Warming with hot saline packs and gentle stimulation produced no peristaltic waves, but it was decided the gut was viable. The small intestine below this incarcerated loop was normal but collapsed. Examination of gall-bladder, appendix, and pancreas showed these organs to be normal in position and condition. The abdomen was closed in layers.

The post-operative course of this case was featureless. The temperature rose to 99° F. on the day after operation, the pulse at no time exceeded 84, and vomiting ceased completely. Fluids only were given for four days, after which a gradually increasing milk diet was instituted. An ox-bile enema on the second day and a simple enema on the fourth day produced stools, and from the sixth day onwards the bowels acted spontaneously. Sutures were removed on the ninth day and the patient was discharged three weeks after admission.

Case 2.—A married man, aged 30, serving in the Army, was admitted to St. Mary's Hospital at 8.30 P.M. on Sept. 10th, 1933, with a history of an attack of severe abdominal pain an hour and a half previously. He stated that he had had about 18 months indigestion, culminating in this crisis. He was much shocked (temperature 97·2° F., pulse 64, respiration-rate 18), cold, and clammy. The abdomen moved very little on respiration, and there was pronounced muscle guard, without true rigidity. Tenderness was chiefly in the epigastrium and to a lesser extent the left loin. Urine normal; chest normal; rectal examination nil. There was no vomiting in this case.

A diagnosis of perforated gastric ulcer, with the possibility of a subacute pancreatitis, was made and laparotomy carried out under light general anæsthesia at 11.30 P.M.—i.e., five hours from the onset of pain. The abdomen was opened through a 3-in. right paramedian incision. The stomach appeared normal, but the duodenum was obviously distended. There was no free fluid in the peritoneum and no sign of gastric or duodenal ulceration. On raising the omentum and transverse mesocolon about 1 ft. of dilated jejunum was discovered immediately distal to the duodeno-jejunal flexure. Beyond this distended loop the small intestine disappeared into a large peritoneal fossa which faced forwards and rather to the left and had a well-marked left anterior and upper border. The fossa seemed rather in the nature of a vertical slit between two layers of peritoneum, and after withdrawal of some 6 in. of gut—easily accomplished—

* In the drawings Figs. 12–14 the anorectal ring and anal intermuscular septum are represented as being a certain distance measured on the palpating finger from the anus. This is only approximate, for length of fingers and anal canals vary. The drawings serve however as a rough but fairly constant guide to those not already familiar with the landmarks.

admitted three fingers without difficulty. The incarcerated gut was obviously viable and was placed well over to the right of the vertebral column, no attempt being made to close the fossa, in view of the patient's poor condition and the fact that the anterior layer of the pocket contained big veins. The pancreas, gall-bladder, and appendix were examined and found normal in all respects. The abdomen was closed in layers.

Apart from several mild attacks of upper abdominal pain (resembling the patient's previous "indigestion") the post-operative course was uneventful. Difficulty was met with in getting normal bowel action, enemas being given every second day until the tenth. Fluids only were given for five days, followed subsequently by a gradually increasing milk diet. Sutures removed ninth day.

A barium meal was given on Sept. 19th, just previous to the patient's discharge a fortnight after admission. This showed "a tendency to regional gastrospasm in the prepyloric zone, perhaps due to recent operative measures, and definite duodenal ileus." A subsequent radiographic examination (Oct. 10th, 1933) showed a normal stomach emptying in four hours, but still a minor degree of duodenal ileus.

DISCUSSION

Classification.—These cases appear to be examples of left paraduodenal hernia, though it is a moot point as to whether the term "parajejunal," as suggested by Brohee, might not be more descriptive. According to Rendle Short [2] paraduodenal fossæ account for only 2 per cent. of retroperitoneal fossæ, but they are, on the other hand, responsible for the majority of internal herniæ in this region. In 1932 Dowdle [3] summarised 140 cases of paraduodenal hernia, the case under his own care being one of the rare "right" type, of which he discovered 35 as compared to 105 "lefts."

Anatomy.—The description of the paraduodenal fossa as given by Cofer and Phillips [4] is as follows. A peritoneal fossa to the left of the ascending part of the duodenum, having the inferior mesenteric vein above the left colic artery to the left, a mesocolic fold below, and the mesentery of the small intestine to the right. Further important relations might be mentioned in the pancreas above, the left renal vein below, the aorta to the right, and behind beneath the posterior peritoneum, the psoas muscle, renal vessels, and possibly left ureter and kidney.

The important anatomical fact with regard to paraduodenal hernia is that the anterior wall of the "sac" is a fold of peritoneum raised by the inferior mesenteric vein to which it forms a small mesentery —the "plica venosa" of Phillips.[5] (This was present in both the above cases, being particularly obvious in the first.) Thus the inferior mesenteric vein really lies in the neck of the sac—an important point in considering treatment.

Clinical picture.—Short [2] pointed out that these cases fall into three main clinical groups: the cases of sudden acute intestinal obstruction (as in Case 1); those of repeated attacks of subacute obstruction (Case 2, as evidenced by 18 months' history of recurrent attacks of "indigestion"); and, lastly, those presenting simply an abdominal tumour. In the cases reported palpation was negative in both instances. Both patients were males, and the condition appears at least twice as commonly amongst men. The average age-incidence is about 35, both reported cases being rather younger than usual.

Diagnosis.—Pre-operative diagnosis is very difficult in these cases, a perforated peptic ulcer being the commonest mistake. This is particularly so in those with a previous history of dyspepsia. The greater tendency to vomiting—and especially repeated vomiting—may be of help as in Case 1.

The duodenal ileus of Case 2, as shown by the repeated radiographic examinations at a later stage, suggests a possible means of pre-operative diagnosis in cases that are not too acute when first seen. Further, it would seem that recurrent subacute herniation into a peritoneal fossa may be a possible factor, I should think usually overlooked, in the ætiology of duodenal ileus. Harris [6] reports a case of right paraduodenal hernia (into the mesenteric fossa of Waldeyer) as giving rise to ileus. I had thought Case 2 was a hernia of this type, but I feel it is rather an atypical "left," since the opening certainly did not look directly to the left and did not contain the superior mesenteric vessels.

Treatment is either by simple reduction, as in the two cases reported, or by reduction plus repair. The latter is of course the more desirable method, but two facts seem to suggest conservative measures as the wiser course to pursue. The "sac" is really a false sac in the sense that it is simply two separated peritoneal layers rather than a peritoneal protrusion, and therefore difficult to remove in toto; and again the immediate and intimate relations of the "sac" make the possibility of serious hæmorrhage (especially from damage to the inferior mesenteric vein in the neck and anterior border) in any radical operative technique extremely probable. The literature provides examples of both lines of treatment—the majority undoubtedly being in favour of simple reduction.

Prognosis.—The mortality-rate in these cases is very high. In Moynihan's [1] series of 100 cases of retroperitoneal hernia in general, it was 80 per cent. At the time of Short's [2] report in 1925, he described 43 cases of paraduodenal hernia with a mortality-rate of nearly 40 per cent. The "left" type is less fatal than the "right."

Recurrences of an acute or subacute type are reported in cases where operation has consisted simply of reduction, but the fact that a large proportion of retroperitoneal herniæ reported have only been discovered by chance at autopsy seems to show that only a small minority tend to become acute abdominal emergencies.

In the two cases reported follow-up reveals that the first patient has since been operated upon and a chronic appendix removed at another hospital, after a preliminary X ray examination which showed cæcal stasis, but no abnormality in the upper abdominal shadows. Unfortunately no reply has been elicited from the patient himself since.

The second patient is at work, hard manual labour now, and writes that he is "many times better since the operation." He states that he is much stronger, eats a greater amount and variety of food, and has not once had a repetition of pain or vomiting. His only complaint is obstinate constipation, despite which he claims to be "a different person altogether."

I should like to thank Mr. R. M. Handfield-Jones, on whose behalf I dealt with these cases, for his permission to publish this report.

REFERENCES

1. Moynihan, Lord: Retroperitoneal Hernia, London, 1899 2nd edit., 1906.
2. Short, A. R.: Brit. Jour. Surg., 1925, xii., 456.
3. Dowdle, E.: Surg., Gyn., and Obst., 1932, liv., 246.
4. Cofer, O. S., and Phillips, H. S.: Ann. of Surg., 1931, xciv., 1088.
5. Phillips, H. S.: Bull. of Ayer Clin. Lab. (Pennsylvania Hosp.), 1922, No. 7.
6. Harris, V. C. J.: THE LANCET, 1932, ii., 240.

A COMBINED STUDY OF THE BASAL METABOLISM AND IMPEDANCE ANGLE IN THYROTOXICOSIS AND MYXŒDEMA

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THE "impedance angle," an electrical property of the body, has recently been studied and measured by Brazier.[1 2] In normal subjects the impedance angle (or I.A.) showed a well-marked sex difference. The mean for males was found to be 0·138, with a normal range of 0·127 to 0·151; for females the mean value was 0·111, with a normal range of 0·121 to 0·100.

A study of this property in thyrotoxicosis by Brazier,[2] showed that much deviation from normal occurred. Values of I.A. were found in nearly all cases to be far outside the standard deviation—i.e., 0·07, for example, in a severe female case, as against the normal of 0·111. Brazier converted the readings obtained into clinical units, in order to simplify matters. Thus, if the subject were female (normal reading 0·111) and her I.A. reading 0·070.

Clinical units = (normal minus reading) × 1000.
= (0·111 minus 0·070) × 1000.
= +41.

Further work [3] showed that the I.A. could be altered by thyroid extract and by thyroxine. Her general conclusions were that the I.A. "forms a very reliable aid to the diagnosis of toxic conditions of the thyroid gland. In this respect it is more specific and more certain than the basal metabolic rate." [3]

PRESENT INVESTIGATION

It was decided to extend the observations made by Brazier and to make, at the same time, further observations on such work as she had reported. Basal metabolic rate (B.M.R.) and I.A. values were studied simultaneously in the following cases: (1) eight consecutive cases of typical Graves's disease, before and after iodine therapy; (2) four consecutive cases of typical Graves's disease before subtotal thyroidectomy, and about 14 days afterwards; and (3) two cases of myxœdema before and after treatment with thyroid extract.

The B.M.R. was determined under standard conditions by means of the Benedict-Roth apparatus with kymographic attachment. The error for the determination is known not to exceed 2 per cent. The standards of Aub and Dubois were employed.

Preliminary investigations showed that the I.A. is unaffected by posture and does not alter over a period of one hour—the time taken for determination of both B.M.R. and I.A. The latter measurements were made by the standard Brazier bridge (kindly supplied by Messrs. Gambrell). It was found necessary to control, in addition to the volume, concentration and temperature of the saline in the arm baths, the position of the baths and of the immersed electrodes.

RESULTS

The results are presented in three Tables.

The results shown in Table I. indicate that in these cases of severe Graves's disease the I.A. was definitely altered (as was the B.M.R.), from the mean of normal subjects. After the administration of iodine the B.M.R. fell, as did the pulse-rate. The fall was associated with an obvious clinical improvement of the patient, but the I.A. was practically unaltered. (It must be noted that in our experience cases of moderate Graves's disease often show I.A. values which are well within abnormal limits; and that roughly one-third of normal female subjects show I.A. values which are within the limits given for thyrotoxicosis.. This will be reported on separately.)

TABLE I.—*Cases of Graves's Disease Before and After Iodine (180 mg. daily)*

FEMALES

Case.	METABOLIC OBSERVATIONS.				IMPEDANCE ANGLE, ϕ.				BASAL PULSE-RATE per minute.	
	Before iodine.		After 8–14 days iodine.		Before iodine.		After 8–14 days iodine.			
	O_2 consumption per min. in c.cm.	B.M.R.	O_2 consumption per min. in c.cm.	B.M.R.	Angle ϕ.	Brazier units.	Angle ϕ.	Brazier units.	Before iodine.	After 8–14 days.
1	240	+23	181	— 3	0·091	+20	0·092	+19	86	68
2	259	+46	227	+28	0·096	+15	0·093	+18	106	88
3	193	+34	151	+ 5	0·074	+37	0·079	+32	110	102
4	378	+91	254	+31	0·056	+55	0·060	+51	122	106
5	200	+17	162	— 4	0·080	+31	0·080	+31	76	60
6	238	+31	196	+11	0·072	+39	0·076	+35	98	72
7	233	+29	181	+ 2	0·081	+30	0·082	+29	108	100
8	244	+61	202	+32	0·097	+14	0·096	+15	134	94

TABLE II.—*Cases of Graves's Disease Before and Shortly After Subtotal Thyroidectomy (Thyr.)*

FEMALES EXCEPT CASE 9

Case.	METABOLIC OBSERVATIONS				IMPEDANCE ANGLE ϕ.				BASAL PULSE-RATE per minute.	
	Before op. and iodine.		9–14 days after thyr.		Before op. and iodine.		9–14 days after thyr.			
	O_2 consumption per min. in c.cm.	B.M.R.	O_2 consumption per min. in c.cm.	B.M.R.	Angle ϕ.	Brazier units.	Angle ϕ.	Brazier units.	Before operation.	After operation.
1	240	+23	181	—7	0·091	+20	0·094	+17	86	76
2	259	+46	178	0	0·096	+15	0·096	+15	106	58
3	193	+34	131	—9	0·074	+37	0·084	+27	110	82
9	293	+30	209	—6	0·112	+26	0·114	+24	94	58

The second or post-operative readings on these patients (Table II.) were taken from 9 to 14 days after subtotal thyroidectomy. No iodine had been

administered before the initial reading was taken, but all cases were given iodine prior to the operation. It can be seen that shortly after subtotal thyroidectomy the B.M.R. has fallen to within normal limits, but that this was not associated with any change in the I.A.

Of those shown in Table III. Case 10 was a well-marked case of "spontaneous" myxœdema which was treated by means of thyroid (B.P. 1932) grs. 2 b.d. Sixteen days elapsed between the initial reading and the second here recorded. Case 11 was one of post-operative myxœdema and received thyroid (B.P. 1932) grs. 4 t.d.s. for six days with a view to producing a rapid elevation of B.M.R. It can be seen that in the two cases of myxœdema studied, the I.A. is not outside the normal limits, while the B.M.R. reflects the clinical myxœdematous state. After thyroid medication, clinical improvement took place, associated with a rise in B.M.R. but without alteration in the I.A.

TABLE III.—*Cases of Myxœdema Before and After Thyroid*

FEMALES

Case.	METABOLIC OBSERVATIONS.				IMPEDANCE ANGLE, ϕ.				BASAL PULSE-RATE per minute.	
	Untreated.		After thyroid.		Untreated.		After thyroid.			
	O_2 consumption per min. in c.cm.	B.M.R.	O_2 consumption per min. in c.cm.	B.M.R.	Angle ϕ.	Brazier units.	Angle ϕ.	Brazier units.	Untreated.	After thyroid.
10	140	−36	225	+ 7	0·103	+8	0·099	+12	52	78
11	151	−23	235	+23	0·115	−4	0·115	− 4	72	110

The dissociation, shown in the cases here recorded, between B.M.R. and I.A. is also evident from a study of the effects of severe exercise. When this is carried out to the point of exhaustion it may elevate the oxygen consumption by 200 per cent. or more and only produce a slight change in the I.A. The remarkable constancy of the I.A. with marked alteration of the thyroid state suggested an investigation of it before and after death. No significant change was noted in the I.A. readings of cats in experiments of this kind.

These results show that little or no change takes place in the I.A. values in spite of great alteration of the clinical state in thyrotoxic patients. They suggest that any change which takes place in these values as a result of treatment is too slow to be of clinical use.

SUMMARY

(1) In eight consecutive cases of typical Graves's disease, the impedance angle (I.A.) was found to be outside the normal limits in the direction indicated by Brazier.

(2) In these eight cases pre-operative iodine medication caused no alteration of the impedance angle although this treatment produced in all of them clinical improvement, fall in pulse-rate, and fall in basal metabolic rate.

(3) In four cases of Graves's disease studied before and 9 to 14 days after subtotal thyroidectomy, no alteration was found in the I.A., although the operation was followed by a fall of B.M.R. and pulse-rate and by clinical improvement.

(4) In two cases of well-marked myxœdema the I.A. was found to be normal. Treatment with thyroid extract produced no alteration in the I.A.

(5) Exercise to the point of exhaustion, producing an increase of 200 per cent. in O_2 consumption, increased the I.A. only by 10 Brazier units (i.e., about 7 per cent).

(6) In cats there is no significant change in the I.A. after death.

(7) It appears from these results that determination of the impedance angle is of no value in assessing the clinical progress of cases of Graves's disease or myxœdema.

Thanks are due to the honorary staff of the Middlesex Hospital for permission to examine their cases; and to Dr. M. A. B. Brazier, Prof. E. C. Dodds, Mr. Olmwood of Gambrell Bros., and Prof. Samson Wright.

REFERENCES

1. Brazier, M. A. B.: Jour. Inst. Elect. Engineers, 1933, lxxiii., 203.
2. Brazier, M. A. B.: THE LANCET, 1933, ii., 742.
3. Brazier, M. A. B., and Grant, F. M.: Ibid., 1934, i., 125.

Clinical and Laboratory Notes

CAVERNOUS ANGIOMA OF THE VERTEBRA

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E. SEYMOUR SMITH, M.B. Liverp.

DEPUTY MEDICAL SUPERINTENDENT OF THE HOSPITAL

A SCHOOL teacher, aged 47, was admitted to the Smithdown-road Hospital with a history of complete loss of power in both legs for 26 years. Up to the age of 21 she had been perfectly healthy, and the onset of the condition was probably gradual from this time.

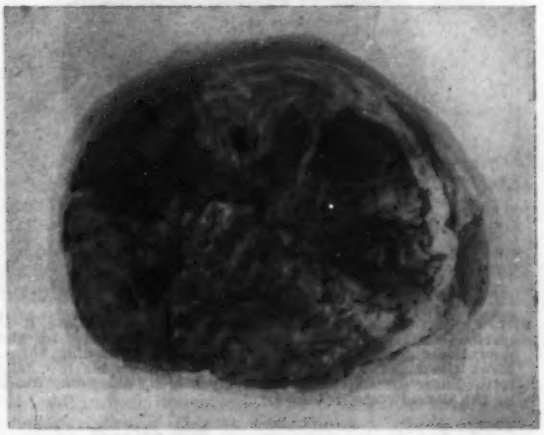

FIG. 1.—Macroscopic view.

Investigation revealed no familial complaint and no ætiological factor could be traced.

On admission the patient was unable to stand, but the general nutrition was quite good, except for slight anæmia and some history of indigestion. The central nervous system alone showed any material abnormality, and here there was clear evidence of a degenerative process of long standing, for muscular atrophy with contractures existed

in the lower extremities. The cranial nerves were normal, the arm-jerks and abdominal reflexes were present and equal on both sides, the knee- and ankle-jerks were absent, and there was a bilateral extensor plantar response. Ankle-clonus was also bilateral. From the level of the ninth dorsal vertebra there was complete loss of pain and tactile sensation. There was complete incontinence of urine, but the anal sphincter was not involved.

The blood and cerebro-spinal fluid Wassermann reaction were negative as was the reaction to Lange's gold sol.

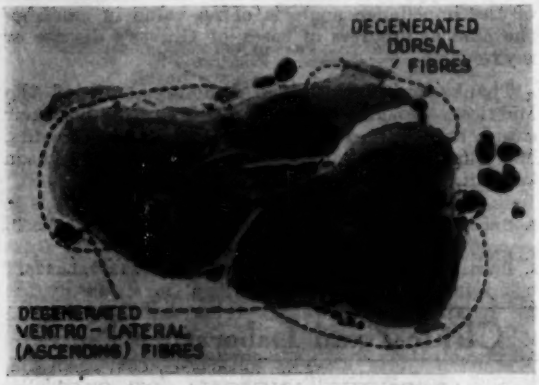

FIG. 2.—Ascending degeneration above the lesion. (×7·5.)

There was no increase in cellular elements, and no alteration in the protein and sugar contents.

An X ray examination of the spine was made and a tentative diagnosis of hæmangioma of the ninth thoracic vertebra arrived at. A macroscopic examination showed the usual irregular absorption of the bony trabeculation with a large swelling extending to either side of the adjacent upper vertebra and to the lower limit of one vertebra below. The outline of the swelling was clearly

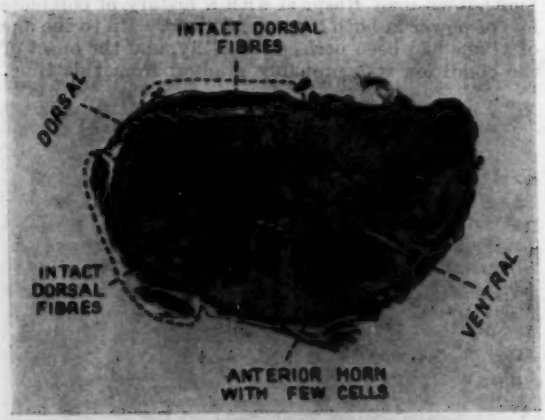

FIG. 4.—Extensive degeneration below the lesion, and it is obvious that there has been considerable pressure, for the dorsal columns are affected as well as the descending fibres. Even the anterior horn is affected and there are few cells left. There are still some relatively healthy ascending fibres in the dorsal region. (×7·5.)

defined, and in its substance a fine network of bony trabeculation enclosing large cystic spaces was seen.

The patient died four months after admission to hospital, and sections of the tumour taken at the autopsy revealed the typical microscopic characteristics of a cavernous angioma (Figs. 1–5).

Ewing [1] reports a similar case, and Nattrass and Ramage [2] quote 11 cases as having been reported before 1927, the first noted being that by Virchow in 1862–63. In 1929 Bailey and Bucy [3] of Chicago put the number of cases as 27 described up to that date.

The one now reported varies in many findings from those mentioned, but in the serological examinations there is almost no difference. It is unfortunate that the antecedent history of this patient is not available, but it seems to be established that from the time the illness was recognised there was no remission and the symptoms of compression persisted and increased. Whether there was an early remission, as in the case of Bailey and Bucy, or whether the onset was gradual as reported by Nattrass and Ramage, it is impossible to say; but with a history of 28 years of inability to walk one feels that the probability lies with a gradual onset. The duration of the condition is of interest, and the contractures and muscular atrophy suggest a slow but steady development.

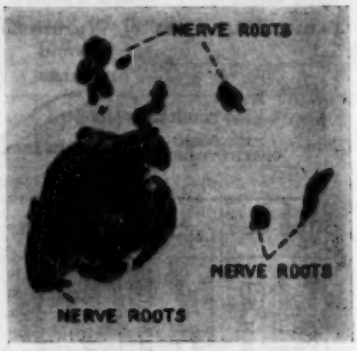

FIG. 3.—Nerve roots which are all that is functional at the level of the lesion. (×7·5.)

Fæcal incontinence was absent in this case, which is not in accord with other reports, although Connell and Hay [4] instance a similar condition in which a sensation of fullness of the rectum was experienced prior to incontinent defæcation. In every patient control of the bladder is reported to have been absent.

The age of onset, in the early twenties, is interesting, and is probably one of the earliest reported. Other

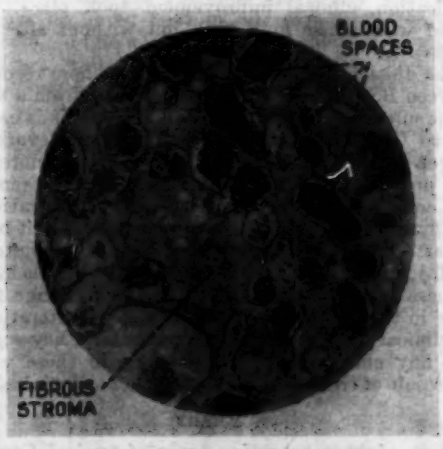

FIG. 5.—Cavernous angioma showing large intercommunicating spaces filled with blood. (×80.)

records show the ages of recent cases as being between the age of 50 and 62 years.

We wish to acknowledge our indebtedness to Dr. John P. Steel, medical superintendent of the hospital, for permission to publish an account of this case.

REFERENCES

1. Ewing, J.: Neoplastic Diseases, Philadelphia, 1928.
2. Nattrass, F. J., and Ramage, D.: Jour. Neurol. and Psychopath., 1932, xii., 231.
3. Bailey, P., and Bucy, P. C.: Jour. A.M.A., 1929, xcii., 1748.
4. Connell, W. T., and Hay, W. D.: Canad. Med. Assoc. Jour., 1930, xxii., 75.

TERATOMA OF THE TESTICLE

ASSOCIATED WITH REPEATED INJURY AND WITH MISPLACEMENT

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TERATOMATOUS new growths of the testicle are uncommon; they are never uninteresting. This case is reported because it presents features that make it more than usually interesting.

The patient, aged 20, was admitted to hospital on March 2nd, 1932. In November, 1931, he had received a blow on the left testicle whilst playing football. His embarrassment was only temporary and he continued playing on that and subsequent days. Six weeks after this injury he had received a second blow from a tennis ball and experienced severe pain and discomfort. He was carried home. During transit the testicle swelled rapidly and was painful and tender. Local treatment slightly reduced the swelling which then remained at a constant level. Several weeks later he had jolted and strained himself whilst getting on a moving tramcar. The swelling and discomfort returned. Two ounces of blood were withdrawn by his local practitioner who sent him to hospital under a diagnosis of hæmatocele.

Previous history.—The patient reported an attack of varicella earlier in 1931, but could remember no event related to his testicle. His father, on being questioned subsequently, reported that when the boy was 8 years old it was discovered that the left testicle had not descended into the scrotum. Under repeated manipulative treatment it came to rest in its normal situation.

On examination the boy looked healthy, but had a temperature of 101° and a pulse-rate of 110. The left side of the scrotum was swollen, reddened, and tender. The swelling was tense, non-fluctuant, and non-translucent. There was a complaint of pain in the left buttock which radiated down the left leg to the knee. There were no palpable glands in the abdomino-inguinal region and no urinary symptoms. The Wassermann reaction was negative.

On March 22nd, 1932, when the temperature and pain had subsided, the swelling was explored. It was found to be solid, with growth fungating through the capsule in two places. The left testicle was removed. There was no attempt at a radical operation. The tumour was soft, infiltrated with pus, and of a mushy consistency.

Macroscopic examination.—The growth measured 5·5 cm. wide by 7·5 cm. long; in two places the growth had broken through the visceral tunica. Centrally the tumour was extremely necrotic and friable, with areas of suppuration. Peripherally the growth was more solid but still soft and easily broken down. Several small cysts were visible. Hæmorrhagic and necrotic areas could still be found and there were suggestions of cartilaginous change.

Microscopic examination.—The growth presented the features of a teratoma with proliferating epithelial elements. The arrangement of the cells varied widely. Adenocarcinomatous areas with columnar cells gave place to solid columns of polygonal and spheroidal cells which ran in tissue spaces. The central part of these columns of cells was undergoing degenerative and necrotic changes. (This change is consequent upon faulty nutrition. The simple blood channels run in the stroma and the centres of the cell groups are poorly nourished.) Cystic spaces lined by single-layered columnar or cubicle epithelium were common. Mucin-secreting cells were seen in parts of the tumour. The stroma varied from a markedly lymphoid type to a fibroblastic tissue, embryonic in appearance, richly cellular and active. The appearances suggested sarcomatous change. Areas of hæmorrhage, polymorphonuclear cell infiltration, degeneration and necrosis, were widely scattered throughout the growth. The advanced differentiation so characteristic of the dermoid was not seen. There was no evidence of tissue of epiblastic derivation. Cartilage, commonly seen in these tumours (though suggested macroscopically), was not found.

Final illness.—The boy was readmitted 18 months later with a large retroperitoneal tumour mass. Laparotomy was performed but no further procedure was undertaken as the condition was obviously inoperable. He died soon afterwards. A comparison of the histology of this tumour with that of the growth of the testis would have been of interest, but unfortunately an autopsy could not be performed.

This case draws attention once again to non-descent and injury as factors in the causation of malignant disease of the testis. The tumour is undoubtedly an example of a teratoma undergoing carcinomatous change. The suggestion of sarcoma in the appearance of parts of the stroma is interesting in view of the statement of Dew [1] that no case of pure sarcoma arising in a teratoma can be found in the literature. The same author in commenting upon the statement that "sarcoma is the commonest tumour of the testicle and that it is an exception to the rule that sarcomata do not metastasise to lymph glands," remarks that the common tumour of the testicle is epithelial and is a carcinoma. Its behaviour in regard to secondary depositions in lymph glands is therefore not exceptional. This case certainly supports that view.

The history of undescended testicle in this case—admittedly somewhat indefinite—does lead to speculation (in view of the very definite repeated traumata in 1931) regarding the treatment of undescended testicle. Opinions are very divided upon this question. Numerous cases of new growth following injury to undescended testicles have been recorded, and in view of this, the removal of undescended testes is worth consideration. Edington and Cappell [2] record an interesting case of adenocarcinoma in an undescended testicle in a horse.

I wish to express my thanks to Mr. Harold Dodd, under whose care this patient was admitted, for permission to record this case.

REFERENCES

1. Dew, H. R.: Malignant Diseases of the Testicle, London, 1925.
2. Edington, G. H., and Cappell, D.: Proc. Roy. Soc. Med., 1931, xxiv., 1139.

ABDOMINAL RELAXATION IN ANÆSTHESIA

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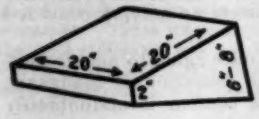
ANÆSTHESIA has made great strides forward of late, and new anæsthetic drugs are continually being introduced. To the surgeon, however, it matters little what drug is given provided the result is good.

Apart from midwifery, practically speaking there is only one reason for giving an anæsthetic and that is the performance of an operation in a painless and safe manner. An anæsthetic fails if both these objects are not achieved. The first is attained easily but the second with more difficulty. The operations where the greatest difficulty arises are all, or nearly all, abdominal operations where absolute relaxation is essential and this is sometimes hard to obtain. Want of relaxation may jeopardise the success of the operation by increasing the difficulty of performance—besides having a disastrous effect on the tempers of all concerned. It is unnecessary to go further into details.

It is of the utmost importance therefore that relaxation should be attained, but this may be quite impossible to bring about by anæsthetic methods alone. In the search for new drugs the simple physiology of relaxation seems to have been lost sight of;

but relaxation can just as easily be got by posture as it can by anæsthesia, and the obvious thing is to combine the two to obtain the maximum effect.

If a person sits in a low chair and his abdomen is palpated it is found to be as lax as it is possible to be, and it requires a great effort on his part to render it tense for any length of time. If the patient is laid flat on his back on a table or couch the pelvis is rotated downwards by the weight of his lower limbs and the abdominal muscles put on the stretch and are naturally tense. We recognise this when we palpate an abdomen and raise the patient's knees to relax the muscles. This sitting, or semi-sitting, position is what is needed on the operating table. It can be brought about by placing a firm triangular cushion under the thighs of the patient so as to raise the knees 6 to 8 in. off the table; relaxation can be increased, but only slightly, by raising the shoulders.



I have used a cushion now for all abdominal cases at St. Mary's Hospital for nearly ten years and have introduced them to the theatres of the other hospitals with which I am associated. Many of my colleagues now use them also in a routine manner. The dimensions of the cushion are as follows (see Figure): thickness, 6–8 in.; breadth, 20 in.; length, 20 in. The cushion is hard, stuffed firmly with horsehair, and covered with waterproof for cleanliness. An ordinary pillow is almost useless, for it is too soft and the knees sink into it in a few moments till they are very little above their ordinary level.

My advice to anæsthetists is to introduce a pillow of this sort to the theatres and nursing-homes where they work. The surgeon may not at first realise the methods adopted to produce absolute relaxation but one and all will appreciate it.

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ROYAL SOCIETY OF MEDICINE

SECTION OF RADIOLOGY

AT a meeting of this section on Nov. 16th the chair was taken by Dr. F. HERNAMAN-JOHNSON, the president. Dr. R. B. KIRKLIN, of the Mayo Clinic, spoke on

Radiology of the Gastro-intestinal Tract

It would be advisable, he said, for every patient with more or less chronic symptoms which might have their origin in the gastro-intestinal tract to be subjected to radiological examination. This was at present impracticable, partly because of expense and partly because a competent radiological service was not always available. The physician therefore only sought the aid of the radiological department when he thought that such an examination would elicit significant data, or when the history and symptoms were strongly suggestive of some lesion of the alimentary canal. The medical profession had appealed widely to the public to come early for diagnosis in order that cancers might be detected at an early stage; the profession was therefore under a special obligation to find existing cancers at the earliest possible opportunity. By radiological means alone could many malignant growths be diagnosed.

Certain clinical manifestations might be regarded as important signals for a full X ray examination of the gastro-intestinal tract. These were: hæmorrhage from the alimentary canal, in the form of gross hæmatemesis or melæna, or of slow oozing or tarry stools; anæmia; marked and rapid loss of weight; repeated attacks of nausea and vomiting; recurring or persistent abdominal pain or distress related to food; constipation accompanied by abdominal pain or alternating with diarrhœa; chronic diarrhœa; and vague atypical abdominal symptoms for which no cause was apparent. Peptic ulcer was so often the cause of gross hæmorrhage from the stomach that it was sometimes diagnosed in the presence of quite a different lesion, for example, œsophageal varix. This condition often showed a characteristic mottled appearance in the skiagram which was sufficient for conclusive diagnosis. A large number of cases, however, did not offer this radiological evidence. The very careful study of the mucosal appearance of the œsophagus which was necessary for the diagnosis was justified by the importance of success when it was attained. It was equally important to make an extremely careful study of the mucous membrane of the stomach. Dr. Kirklin illustrated this point by reference to a case of a woman of 49 who, during an attack of sick headache a month before, had spat out about a tablespoonful of bright red blood. She had feared cancer and had had a radiological examination which had proved entirely negative. At the Mayo Clinic she had been allowed to drink the barium too quickly, and once again the reports had been negative. A careful study of the mucosal pattern with the first mouthful or two of barium had, however, revealed some interruption of the rugæ with an elliptical shadow, indicating a sessile polyp on the posterior wall of the stomach. She had in fact had an adenomatous polyp 2 cm. in diameter with shallow ulceration on the surface. Unless the radiological examination was carried out in such a way as to allow of frontal observation of the mucosal relief, small lesions would escape observation. Because most lesions deformed the profile of the barium, this necessity for careful study of the mucous membrane had not received the full recognition it deserved.

For the detection of small lesions in the colon the double contrast method was essential. The colon was filled with a barium enema in the usual way, but if this examination proved negative and there was a history of bleeding, the colon should subsequently be filled with air. The patient was sent away to evacuate the enema, which he was usually unable to do completely at first. When he returned the colon was distended with air under fluoroscopic control, and if remains of the enema were found in the colon the patient was sent away to defæcate again, the introduction of the air having given him the necessary stimulus. This was repeated until the colon appeared absolutely clear, and the introduction of air then served to show up lesions like small polypi which often proved to be low-grade cancers. At the Mayo Clinic this double contrast method was an absolute routine if no other cause for bleeding from the rectum could be found.

One of the most perplexing signs with which the physician had to deal was anæmia, and a laborious investigation was often necessary before a diagnosis could be made. Benign polypoid new growths in the stomach or bowel might become superficially eroded so that there was a slight constant seeping away of blood. In every obscure case there should be a radiological examination of the gastro-intestinal

tract. In one case a man of 65 had come to the clinic for general examination as he felt he was "getting on." He had no particular symptoms but the routine investigation revealed a low-grade anæmia. He had had hæmorrhoids for eighteen months or two years with slight bleeding which he had ascribed to the piles. Barium enema had not revealed any lesion, but the double contrast method had shown up a small round pedunculated polyp which had been successfully removed. It was very important to have stereoscopic films to distinguish these small growths from fæcal contents. To consider cancer in cases of loss of weight might seem illogical in the absence of any symptoms pointing to the gastro-intestinal tract. Nevertheless, cancer of the alimentary canal was extremely insidious in onset and was often heralded by loss of weight. A competent radiological examination was often the only means of making an early diagnosis. In one case a man of 45 had complained of nothing whatever but the loss of 25 lb. in three months and of an inability for three weeks to digest one of his favourite dishes. The radiographs showed extensive ulcerated carcinoma of the distal half of the lesser curvature of the stomach.

Recurrent vomiting for no obvious reason was an emphatic indication for radiological examination, but nausea was not an impressive symptom and might be ignored. Yet it might be the sole indication of serious gastric disease. A physician suffering from angina pectoris and coronary sclerosis complained of rather persistent nausea, particularly noticeable with an empty stomach. Gastro-intestinal examination in the radiological department had shown a very small lesion on the lesser curvature with a typical meniscus sign; he had in fact an extensive perforating cancer of the stomach, fixed to the pancreas. The clinical manifestations of peptic ulcer were definite, but it was not easy to distinguish between gastric and duodenal ulceration or between malignant and benign growths. In these differential diagnoses radiology might often be of the greatest help. If the radiologist could definitely visualise a crater the duodenum should be opened up even though the surgeon was unable to find a growth on superficial examination. A persistent fleck of barium remaining in the duodenum despite manipulation often revealed an ulcer which failed to cause deformity. Duodenitis might also be diagnosed by a study of the duodenal mucous membrane in certain cases. This condition was not regarded at the Mayo Clinic as necessarily a forerunner of duodenal ulceration. The symptoms might extend for about the same period of time and have the same degree of severity as those of duodenal ulcer. Duodenitis was therefore diagnosed when the radiologist found transient and varying deformity of the duodenum combined with irritability and spasm, so that the barium rushed through and an adequate picture was very difficult to obtain. The mucosa, when visualised, appeared as a fine reticular network.

It was possible in the preliminary fluoroscopic examination to recognise the presence of air between the diaphragm and the liver. This, in the absence of recent surgical intervention, indicated a perforating lesion and further radiological examination was contra-indicated.

DIFFERENTIAL DIAGNOSIS OF BENIGN AND MALIGNANT CONDITIONS

Every gastric ulcer should be regarded as malignant until the contrary was proved. The following differential points were, however, useful. The benign growth was usually less than 2 cm. in diameter; any ulcer more than 2·5 cm. across was probably malignant. The benign ulcer showed a regular hemispherical outline with a sharply defined dense barium shadow; the malignant one was conical and irregular with a faint, poorly defined outline. The benign growth usually appeared on the lesser curvature distant from the pylorus, while the malignant would be found on the greater curvature or the posterior wall; 75 per cent. of ulcers near the pylorus were malignant. Peristalsis was diminished or absent and spastic manifestations were rare in malignant growths, but the benign ulcer was usually accompanied by active peristalsis and often by narrowing or curling of the antrum and hour-glass contraction. The pylorus also was spastic, whereas in malignancy it would be found gaping. The rugæ usually converged towards the niche of a benign ulcer, while in a malignant case they were faintly marked or effaced. The best test, however, was the therapeutic test. It was very exceptional for a malignant ulcer to disappear under a fortnight's medical treatment.

The possibility of diaphragmatic hernia should always be borne in mind by the radiologist. The diagnosis of prepyloric hypertrophy from gastric syphilis and prepyloric ulcer or cancer was difficult, but there were three distinguishing symptoms and if two of these were present a diagnosis of hypertrophy might be made. These were a slight invagination or mushrooming of the bulbar base, a marked cleft in the inferior border of the canal and an elongation of the canal. Chronic or recurring diarrhœa called urgently for full colon investigation. Patients who presented peri-abdominal symptoms often enough owed them to purely functional conditions, but in a small minority there were diseases of the gastro-intestinal tract which could hardly be diagnosed without radiology. The stomach had been described as the fire-alarm box of the abdomen, and many negative reports must be expected. Nevertheless, radiology was capable of giving worthy assessments in diagnosis and in the elimination of malignant disease.

DISCUSSION

Dr. A. E. BARCLAY said that the double contrast method had originated in this country but had been neglected. He asked what was the proof of malignancy; the only real proof was the death of the patient, and that was averted by surgical intervention.

Dr. J. A. E. LYNHAM thought that duodenitis was less a pathological entity than a reflex associated with some lesion elsewhere.

Dr. G. E. VILVANDRÉ thought that duodenitis was a bad diagnosis, the condition really being duodenal ulcer. The failure to diagnose malignancy early was not the fault of the radiologist or even of the physician, but of the patient, who went to the chemist when suffering from abdominal discomfort. In his experience 99 per cent. of ulcers on the greater curvature of the stomach were malignant.

MEDICAL SOCIETY OF INDIVIDUAL PSYCHOLOGY

AT a meeting of this society held in London on Nov. 8th, with Dr. J. C. YOUNG, the president, in the chair, a paper on

Post-menopausal Neuroses

was read by Dr. HILDA WEBER. In considering the factors favouring the onset of post-menopausal neuroses, she pointed out that at this period of life the interest of sexual maturity has passed, and even the menopause as a matter of condolence is over, whilst the time when a woman's years have become

a source of pride has not yet arrived. These and other circumstances cause personal limitations to come into bolder relief, throwing possibilities into shadow. It is not therefore surprising that any defect in the individual's life-style is liable to make itself felt. Indeed, contrary to popular opinion, there is no real difference in the incidence of mental disorder at this time of life and at the menopause. Nevertheless, though menopausal disturbances have received much attention, comparatively little has been written about the post-menopausal period. In treatment the age of onset makes it necessary to get practical results in a relatively short time. It also suggests that the faults of life-style may be deeply embedded; a certain fixity of behaviour is in fact inseparable from this time of life, and this makes it hard for the patient to remould her way of living. Prolonged and deep analysis is generally held to be inadvisable—if, indeed, it is possible. Yet a fair working knowledge of the patient's history and personality is essential if sound results are to be obtained. For though new paths may not now be made, the way in which the patient has for so long withstood the stresses of life indicates that the old paths had something of constructive value. It is the work of the doctor to discover these constructive elements, and to proceed from these to the possibilities of future development. In this work the method of approach is important. The faults existing in the patient's life plan have become so closely woven into her personality that clumsy attempts at psychotherapy may do more harm than good. On the other hand, with correct technique, where coöperation is obtainable, a very real success is possible. The obstacles, said Dr. Weber, will stimulate and not deter the true investigator.

LIVERPOOL MEDICAL INSTITUTION

AT a meeting of this institution on Nov. 8th, with Dr. J. MURRAY BLIGH, the president, in the chair, Mr. J. B. OLDHAM read a short paper on

Coccygeal Sinus

He reported a series of 23 cases of coccygeal sinus seen since 1933, 14 of which were in females. Twenty were infected when first seen; of these 19 were excised, the wound being sutured, and primary union was obtained in all. Mr. Oldham considered that if primary union was to be obtained there must be asepsis or adequate antisepsis, avoidance of post-operative infection from the anus, complete hæmostasis, avoidance of buried absorbable sutures as ligatures, obliteration of the cavity left after excising the sinus, and the use of an everting stitch that will overcome the tendency of the skin edges in this region to turn in. The patient is prepared as for hæmorrhoids, and after operation fluids only are given and in this way the bowels are kept unopened for six to eight days. A wide elliptical incision is made down to the sacro-coccygeal ligaments. Hæmostasis is secured by forci-pressure and hot packs. The cavity is obliterated by deep sutures—usually six—of silkworm which pass through all the thickness of the tissues in the edge of the cavity left after excision and also take a bite of the ligaments in the dorsum of the sacrum. Mr. Oldham noted that in 18 of his cases there were secondary sinuses, and of these 14 opened on the left of the midline. In only one case had a correct diagnosis been made before the case was referred for consultation. This failure to make a correct diagnosis Mr. Oldham considered natural, as in only one of the standard English text-books of surgery was coccygeal sinus even mentioned.

Hour-glass Tumours of the Spine

Prof. HENRY COHEN read a paper in which he said that in a series of 50 cases of compression paraplegia due to tumours of the spinal canal he had observed three cases of so-called hour-glass tumours, which merited separate clinical description because despite their varied pathology they displayed characteristic features which gave rise to special problems, both in diagnosis and treatment. He confined his detailed records to those cases having extra- and intra-dural masses joined by a narrow pedicle passing through an enlarged intervertebral foramen. He emphasised that any level of the spine was a possible site for such a tumour which might arise from nervous, fascial, osseous, and other local tissues. These tumours displayed the usual symptomatology of spinal compression with corresponding changes in pressure and chemistry of cerebro-spinal fluid, but additional features which merited emphasis were (1) the frequent and severe root pains which resulted from the situation of the tumours; (2) the presence in the cervical and occasionally in the lumbar region of a palpable mass; and (3) pain on movement of the spine, rigidity, &c., arising from the vertebral damage. The X ray picture was in most cases typical though commonly interpreted as tuberculous disease of the spine with secondary abscess formation. In order to prevent recurrence of the tumour, both intra- and extra-spinal portions must be removed, the primary attack being on the intra-spinal portion.

In the discussion which followed, Dr. G. S. SWAN said that in a case under his care the first symptom was severe pain along the course of a nerve, which Prof. Cohen had stressed as an important point in the differential diagnosis. For about six months before the onset of pressure symptoms the patient had severe "neuritis" of the left arm. Pressure symptoms arrived suddenly and affected the left arm and leg. He was then seen by Prof. Cohen and later operated upon by Prof. R. E. Kelly. Convalescence was uneventful, and except for slight paresis of the left arm, relief of symptoms was complete. The patient had been at work at his old job as a labourer carrying heavy loads for over two years. He states he is quite well and able to do the heaviest work. There is no trace of any paresis and recovery seems complete.

NORTH OF ENGLAND OBSTETRICAL AND GYNÆCOLOGICAL SOCIETY

AT a meeting of this society held in Liverpool on Oct. 26th, with Prof. DANIEL DOUGAL (Manchester), the president, in the chair, a note on the use of

Willett's Forceps in Placenta Prævia

was read by Mr. C. H. MARSHALL (Liverpool). This method of treatment, he said, was introduced in 1925 by the late J. Abernethy Willett, who believed that the simplest means of controlling bleeding in placenta prævia was to puncture the membranes and make downward traction on the presenting vertex by means of Martel's scalp forceps. (These forceps had since been modified and called after him.) The method involved minimal handling, and consequently less risk to the mother and a better chance for the baby. In the period 1926–31 before it was introduced at the Liverpool Maternity Hospital 170 cases of

placenta prævia were treated either conservatively or by podalic version or Cæsarean section; there were 14 maternal deaths (8·2 per cent.) and in the cases treated by version less than 12 per cent. of the babies survived. Willett's procedure was adopted in 1932, and had been increasingly used since then, with a corresponding decrease in the number of versions. During this second period 118 cases had been treated, with 4 maternal deaths, and in the cases treated with Willett's forceps half the babies had survived. The percentage of cases treated by Cæsarean section remained constant at about 20.

Method of application.—The lithotomy position is desirable but not essential. Anæsthesia is not used in a very anæmic patient; indeed, it is often omitted in multiparæ. It is important to remove any clots present from the vaginal vault; this can be done simply by inserting a Sims's speculum along the posterior vaginal wall, and then depressing the vulval end. An assistant fixes the head; two fingers are passed into the vagina, and one or both, according to its dilatation, through the cervix. A point is sought where only membranes intervene between the head and the examining finger; this is most likely to be in front, as the placenta is usually found on the posterior wall of the lower segment. The membrane hook is guided along the fingers, and the membranes scratched through against the head. Without withdrawing the fingers, the forceps is similarly guided in, opened, pressed firmly against the scalp, and closed. The grip on the scalp is tested by traction, which should control any hæmorrhage at once, before the fingers are withdrawn. A cord carrying a pound weight over a pulley at the foot of the bed is attached to the handles of the forceps. If anæsthesia has been used, the tension should be controlled with the hand until vomiting has stopped. The forceps is removed when the head has descended completely into the pelvis.

Comparison with other methods.—In Willett's method anæsthesia may often be omitted; the manipulations are gentler, less blood is lost, and less liquor escapes than during a bipolar version. The disadvantages of a breech presentation, especially in a first pregnancy, are avoided. Version tends to be used in cases of complete placenta prævia, and this partly accounts for the high fœtal mortality. If a de Ribes's bag can be inserted easily, the forceps can be applied still more easily, and with better results. Vaginal packing is a bad method, owing to the high incidence of sepsis. It was usually used if the os was closed or nearly so; if there is, as there almost always is, room for one finger and the forceps to pass through the os, the forceps may be applied.

Mode of action of the forceps.—When the forceps is applied against the most accessible part of the head and the jaws are closed, a ridge of scalp is raised. If traction is now applied a wider area of scalp is drawn out in the form of a cone, the apex of which is drawn into the internal os; thus pressure is made on the bleeding surface, and hæmorrhage at once checked.

Indications for its use.—The vertex must be presenting. If the breech is downwards, external cephalic version can be done and the forceps applied, but this is not recommended; it is simpler to bring down a leg. With a transverse lie it is probable that the placenta prævia is complete. With a complete placenta prævia, owing to the profuse hæmorrhage which may accompany any vaginal procedure, the mother's interests are often best served by Cæsarean section. In an emergency it is probably easier to burrow with the fingers through the placenta and grasp a foot than to apply the forceps to the scalp of a head which is difficult to fix and perhaps even to bring to the middle line. In disproportion, which is seldom met with in these cases owing to the frequency of prematurity, Willett's forceps is contra-indicated.

Disappointments.—Rarely the forceps loses its grip and comes off before fulfilling its purpose, and this necessitates reapplication or some other form of treatment. It occurs most commonly if the scalp becomes macerated. On applying the forceps it is important to ensure that the amount of scalp grasped has completely and evenly filled the jaws of the instrument. Other disappointments are usually due to factors common to all methods of vaginal delivery in this condition; not infrequently the fœtus dies in utero.

In conclusion Mr. Marshall said that traction on the scalp perfectly fulfils the greatest of its aims—the control of hæmorrhage. If Willett's method were more widely used fewer mothers would die and more babies would survive. While not comparing it with Cæsarean section, which had its special sphere of usefulness in the treatment of placenta prævia, he maintained that it was simple and could be more easily carried out than bipolar version.

Mr. J. ST. GEORGE WILSON (Liverpool) read a note on the

Aschheim-Zondek Reaction in Genital Tuberculosis

He had had two cases of proved tuberculous salpingo-oöphoritis with positive Aschheim-Zondek test before operation; two cases of prolonged amenorrhœa with histories suggesting tuberculosis with positive A-Z test; one case definitely phthisical with a short period of amenorrhœa and a negative A-Z test, but showing evidence of increase of anterior pituitary secretion; two cases giving negative A-Z test, but showing evidence of excess of anterior pituitary, with a definite history of tuberculosis, in one case positive before operation; and two cases giving completely negative A-Z test after being treated, in one case by operation at which tuberculosis was proved, and in the other, clinically tuberculous, by deep X rays. He concluded that the Aschheim-Zondek test was commonly positive in association with tuberculous salpingo-oöphoritis; that the presence of a positive test associated with amenorrhœa when pregnancy could be excluded was suggestive of tuberculosis; and that the presence of a modified test might indicate healing or retrogression of genital tuberculosis, especially if it had been previously positive. He commented on the fact that nothing had been written on the subject.

Cases and Specimens

HYPERSEXUALITY TREATED BY PARTIAL OVARIOTOMY

Mr. P. MALPAS (Liverpool) described the case of a woman of 23, suffering from uncontrollable sexual irritability. She was a normally built girl, who had had a child at 16, and lived on the streets thereafter until she was 22, when, on account of soliciting, she was placed on probation in an institution. On examination both ovaries felt enlarged but mobile. Laparotomy was done in the hope that the ovarian change might be at the root of the trouble. Both ovaries contained innumerable follicular cysts. Wedge resection was done on each side, and a quarter of each organ left. Both pampiniform plexuses were varicose, and the more prominent veins were ligatured. Mr. Malpas interpreted the case as follows: long-continued excessive sexual stimulation caused over-production of mature follicles; the undue number of follicles ripening simultaneously caused hypersexuality. The case was treated in the second phase of a vicious cycle, and resection of the hypertrophied ovaries allowed re-establishment of a normal level of sexual function.

ACTINOMYCOSIS OF THE OVARY

Dr. C. H. WALSH (Liverpool) described a case of actinomycosis of the ovary. The patient was a woman of 26 with one child. For six months she had had occasional attacks of severe lower abdominal pain, sometimes with vomiting. There was general weakness and wasting, and complaint of dysmenorrhœa with scanty menses, brownish intermenstrual discharge, and constipation. On examination the general condition was poor, and a mass was felt in the right fornix attached to a bulky, tender uterus. A diagnosis of right tubo-ovarian abscess was confirmed at operation on Feb. 2nd, 1934. It was

adherent to an inflamed appendix, omentum, and small intestine. The right tube and ovary and the appendix were removed; the left appendage was normal. She was discharged from hospital on March 2nd, but readmitted on July 16th, after considerable menstrual irregularity and pain in the lower left abdomen with some vomiting for the last four weeks. There was a mass palpable in the left appendage which was diagnosed as a left tubo-ovarian abscess. This was removed entire on July 20th. A loop of gut firmly attached to the uterus precluded hysterectomy. Another loop was firmly adherent at the bottom of Douglas's pouch. An ileo-ileostomy was done to prevent intestinal obstruction; two feet of ileum were left adherent in the pelvis. The wound discharged foul pus on the fifteenth day, but healed later. A blood transfusion was given four weeks after operation; her condition then improved considerably. Later she developed persistent abdominal pain and vomiting, and a mass became palpable in the right iliac fossa. The pathologist then reported that the section taken from the abscess wall contained actinomycosis. The patient was subsequently treated with iodine in milk, and her condition improved. The mass is now no longer palpable; there is an occasional discharge of pus from the lower end of the wound.

Actinomycosis of the appendages, Dr. Walsh said, is very rare. Arthur Stern in 1928 concluded that the origin was usually from the gut, and infection from the vagina is very doubtful.

The PRESIDENT reported the after-history of a case of sarcoma of the uterus and a case in which five years ago he successfully constructed a vagina by Baldwin's operation; Dr. J. W. BRIDE (Manchester) described a case of adenocarcinoma of the corpus uteri associated with squamous carcinoma of the vagina; and Dr. WALSH showed a specimen of tubal chorion-epithelioma.

HUNTERIAN SOCIETY

AT a meeting of this society held in the Cutlers Hall on Nov. 19th, with Dr. W. H. F. OXLEY, the president, in the chair, the subject of discussion was

The Lay Cult of Health

Sir ERNEST GRAHAM-LITTLE, M.P., in maintaining that this cult has become injurious, spoke of the irresponsible advice provided by newspapers not only in flamboyant advertisements of patent medicines, but also in contributions, usually unsigned, called "health notes." These contributions could be divided into two classes: (1) the obvious—including injunctions to eat more fruit, drink more milk, or swat that fly—which had the merit of being harmless, and (2) those in which the editor pretended to convey the latest information, not yet known to the medical profession, about remedies for cancer, or tuberculosis, or manipulation of the spine. Information of both types was utterly useless. Mass production was at its worst in medicine. When a man was really ill he sought the personal advice of the best expert he could find, and his most useful aid was the general practitioner. Morbid introspection was often engendered and fostered by the layman dwelling on aspects of disease of which he must be ignorant. Diet was one of the subjects most often dealt with in newspapers, and the reader was easily persuaded to a rigidity which denied him the advantages of a mixed diet. The suggestion had been made that the medical profession should attempt to purvey sound and honest information on which the public could act with confidence, but the speaker was not sanguine about the success of such efforts. All that was possible in this public way was, he thought, to emphasise the importance of fundamental principles of health.

One sad effect of lay medicine, continued Sir Ernest, was the lamentable waste of money, and he could wish that "Secret Remedies," that admirable publication of the British Medical Association, could be distributed freely among the poorer classes. Concoctions costing a few pence were sold for as many shillings, and drug-taking on the patient's own initiative easily led to dangerous addiction. Efforts had been made in Parliament to amend the laws governing the sale of patent medicines, but they had to contend with vested interests. Newspapers derived a very large part of their revenue from advertisements of these remedies: the Sunday papers and the religious journals were full of them. The possessor of a 100-guinea watch would not be so foolish to entrust its repair to a plumber or a smith; yet he would cheerfully commit his body—which was far more complex and valuable—to people who were ignorant of its working. The only sure way to combat these things was by a better education of the mass of the people, particularly in biology, and he had tried (without success) to induce the senate of the University of London to include biology among the compulsory subjects in the matriculation examination. The existence of a large and growing body who understood human function would do much to counteract the activities of the untrained health adviser, the journalist who turned to medicine as a by-product.

Dr. HENNING BELFRAGE said that no one, doctor or layman, could be content with the present health and physique of the people; hence the cultivation of increased health was clearly to be desired. Every individual, moreover, must be educated in the elementary principles. The medical profession itself had been preoccupied with the ideas of morbidity, almost forgetting that there was a state of health which was something more than a mere negation of disease, and that much remained to be taught concerning it. He feared that credit for the increase of public interest in health must be given largely to lay initiative—e.g., the activities associated with boy scouts, girl guides, and infant welfare centres—and the Ministry of Health and other bodies had signally failed to follow the trend of opinion. He would welcome a move in medical societies to discuss health as well as disease. He did not agree that scientific knowledge could not be translated into language which ordinary people could understand; by means of the popular press, the cinema, and the wireless this idea was being proved untrue. A distinguished medical man had said that the road to health was a broad and easy one, so that only fools needed to err; why, then, was this road lined with repair shops for the machines which had broken down through faulty usage or neglect? The whole matter called for organised effort.

Mr. ELLIS BARKER introduced himself as an example of what the opener regarded as a despicable quack. After describing the improvement he had wrought in his own health, he contended that the mass of the people were misled not only by commercial interest but by members of the medical profession too. Medicine went by fashions; at one time it was micro-organisms, at another bleeding of all and sundry. The profession did not possess a monopoly of medical knowledge, and a man might pass medical examinations without being able to do a thing. He believed that the profession had largely lost its weight with the public, and also that medical science had never been at such a low ebb as it was to-day.

Mr. DOUGLAS WOODRUFF said that patent medicines were expensive because of cost of advertising them. The continual publicity built up confidence, so that in illness people turned to what had become a fixed idea of cure. Quacks were nothing new; a suffering person was glad of anybody or anything which was likely to offer help. To stand aside and say that knowledge could be imparted only in a private interview was somewhat idle. Personal history was individual, but there was a common humanity, and there was a large body of collective wisdom which could be imparted otherwise than by a pat on the back. The general practitioner was the doctor the public liked best, and that was because he was least a doctor and most a man. It was impossible to stop public curiosity in such matters as health; neither could newspapers be prevented from catering for that curiosity.

Dr. H. H. SANGUINETTI thought that before medical men wrote for the public they would do well to come together and convince the great body of the profession that the views they were propounding were correct. The public thought that medical men were so much concerned with the cure of disease that they were not the people to consult about health. He doubted whether the present dogmatic teaching by the medical profession was the best way to go about the work.

Sir JOHN WEIR, speaking as a homœopathic physician, said that people wanted to live the best life they could, and if the profession had beneficial knowledge to give, it should be given freely. Everything should be done to get rid of the present hypocritical attitude.

Sir BRUCE BRUCE-PORTER thought that every article published on health should be signed by its author. The future of the profession lay along the lines of prevention rather than cure, and in time to come people would look to their doctor as their medical officer of health.

PATHOLOGICAL SOCIETY OF MANCHESTER

AT a meeting of this society on Nov. 14th Prof. O. C. W. PRAUSNITZ spoke on

Idiosyncrasy

Case-histories of urticaria, asthma, and digestive supersensitiveness demonstrated, he said, the general uniformity of the chief symptoms, no matter what the exciting cause, and fairly independently of the particular tissue affected. This was well illustrated by researches on hay-fever. The fundamental work was carried out by Blackley of Manchester who, himself a hay-fever patient, in 1873 described the characteristic features of the malady and cleared up its ætiology; he also showed the way to prevent the onset of the attacks. Dunbar and Prausnitz studied the ætiological agent of the disease and prepared an antiserum which was shown to act not as an antitoxin but as a kind of cytolysin. Comparison of this and kindred diseases with anaphylaxis had led the speaker to demonstrate in the serum of supersensitive patients a substance which transmitted the sensitive condition to normal persons. The chief feature of the test, the Prausnitz-Küstner test, was to inject intradermally 0·1 c.cm. of the patient's serum to a normal subject and to inject into the same spot on the following day 0·1 c.cm. of a suitable dilution of the causative agent. A local urticarial reaction developed; there was no danger of general sensitisation to the person subject to the test.

This method was applicable to many forms of supersensitiveness. The ætiology of supersensitiveness was twofold. (1) The attacks were brought on, probably in every case, by a specific agent. The specific antibodies in the patient sensitive to this agent would liberate from it some decomposition product, perhaps Oriel's P-substance, which caused the lesions. (2) The liability of certain persons to produce such antibodies must depend on a constitutional factor which in many cases was inherited. Treatment was directed against the agent by desensitisation with the specific substance or non-specific substances—e.g., peptone. General measures served to lower the vagal superexcitability present in most cases; this was sometimes achieved by the administration of calcium preparations.

ROYAL ACADEMY OF MEDICINE IN IRELAND

A MEETING of the medical section was held on Nov. 2nd with Dr. V. M. SYNGE, the president, in the chair.

Gee's Disease

Prof. HENRY MOORE, in collaboration with Drs. W. R. O'Farrell, J. A. Geraghty, M. Moriarty, and J. Murray Hayden, read a paper on Gee's (cœliac) disease in adults. After a review of the subject embracing the work of Hess Thaysen in Denmark, and of Bennett, Hunter, and Vaughan in England, he described eight cases of the disease. In seven of them (one not tested) there was a high proportion of total fat in the stools; the lowest fat percentage was 32 and the highest 51·4 (the average normal being 18). In all the patients the amount of split fat and the amount of nitrogen in the stools was normal but some had a high soap-fat content. All had a history of diarrhœa at one time or another; two had macrocytic anæmia without achlorhydria, five had hypochromic anæmia; five had hypocalcæmia, two had tetany, and all save one had decalcification of bones. In three cases the skeletal changes were so advanced as to cause multiple pathological fractures. Seven cases (one not tested) had a low blood-sugar curve in the glucose-tolerance test and the blood-urea was low in five. Three had achlorhydria. Blood cholesterol was normal or subnormal. One case had hyperthyroidism and five had some degree of infantilism. One had ununited epiphyses at 26 years of age and one at 20; the former grew four inches between the ages of 23 and 26 years. In three there was a decrease in height. Lens opacities were present in two out of seven (tested by Dr. D. O'Donoghue). The macrocytic anæmia yielded to treatment by liver extract and Marmite and the hypochromic anæmia to iron by mouth in all cases. Calcium and vitamin D in large doses, with a fat-low diet, relieved tetany. Hydrochloric acid by mouth was used for achlorhydria. The fractures united in all three fracture cases, and the calcium content of the bones increased in all those showing bone decalcification save one. One patient died, but in six others the results of treatment were considered satisfactory, one case being too recent to form a judgment. The terms non-tropical sprue and idiopathic steatorrhœa used to describe the disease are unsatisfactory said Prof.

Moore. Gee was aware that the malady occurred in adults; therefore, honour being given where due, the condition should be known as Gee's disease.

Dr. EDWARD HARVEY referred to the results obtained by McCarrison in experimental vitamin-B deficiency. Rabbits put on a diet of rice developed many of the symptoms of cœliac disease. When butter was added to the diet the condition, instead of improving as was expected, grew worse, and the diarrhœa changed to steatorrhœa.

Dr. GEOFFREY THOMPSON said that in such a complex syndrome as Gee's disease there was almost certainly some underlying factor common to all cases and from which all the features of the syndrome resulted. The probable primary fault was defective fat absorption resulting in the fixation of calcium in the intestinal contents. From this would follow the defective calcium absorption and the resulting abnormal calcium metabolism producing the clinical features of bone disease and tetany. He drew attention to two peculiarities of fat absorption—namely, the fact that the molecule of fatty acid was very large compared to those of hexose or amino-acid in the case of carbohydrate or protein absorption, and secondly, the fact that fat was largely absorbed by the lymphatic vessels whereas the other foodstuffs were absorbed by the blood. He suggested the estimation of changes in the blood fat following fat meals as a means of throwing light on the condition.

REVIEWS AND NOTICES OF BOOKS

Radiotherapie. Rayons X—Radium

By PAUL COTTENOT, Médecin électro-radiologiste à l'Hôpital Broussais; and SIMONE LABORDE, Chef du Service de Curiethérapie à l'Institut du Cancer. Paris: Norbert Maloine. 1934. Pp. 514. Fr.70.

IN its second edition this volume of the series of medical monographs published under the direction of Emile Sergent, L. Ribadeau-Dumas, and L. Babonneix has been almost completely rewritten and brought up to date. The introductory section of physics is on the usual lines, and the chapter on appliances which follows is clearly written and illustrated by examples of French machines. A more detailed discussion of modern shock-proof apparatus would have enhanced the value of the work. The chapters on radio-active substances and the methods of applying radium are written with authority; the English reader will be astonished to find descriptions of apparatus for the inhalation of radium emanation mixed with vapour and for the solution of emanation in water for internal medication, methods which, in this country, are looked upon as either useless or dangerous. The directions for applying radium and for calculating the dosage received from applicators of varying design are on the whole excellent.

The biological discussion is particularly interesting. It includes a summary of experimental work, much of which has been carried out in France, and a discussion of the various factors which influence the absorption of energy by the living cell, and, in particular, by the cancer cell, which should be read by all interested in the subject. The authors believe that the effect of irradiation is both direct on the tumour cell and indirect on the tumour bed, and they point out that, although a number of workers, the first of whom published their results in 1923, have tried to show that the whole effect could be attributed to the indirect action, the experimental work of investigators at the Fondation Curie has shown conclusively that irradiation has a direct effect on the cell itself. Although not prepared to deny the possibility, they do not believe that any experiment has proved conclusively that the effects of radiation produce immunity to cancer in the human being, and they regard the changes obtained as purely local.

The action of X rays and radium on the different parts of the body are discussed; the therapeutic reactions observed are well described, and also the excessive reactions which produce radionecrosis, and possibly later malignant changes. Statistics are adduced to show that the accusation that irradiation results in the early and frequent appearance of metastases in malignant tumours is without foundation. The actual methods of treating lesions in every region of the body are set out in detail, and this section provides an excellent source of reference for all engaged in this work. Radiotherapy is still largely a matter of experiment, and so much valuable experience has gone to the writing of this book that it cannot fail to be of great service.

Modern Advances in Diseases of the Throat

By ARTHUR MILLER, F.R.C.S. Edin., D.L.O., Surgeon for Diseases of the Ear, Nose, and Throat, French Hospital, London; Assistant Aurist, London County Council. London: H. K. Lewis and Co., Ltd. 1934. Pp. 120. 10s. 6d.

NOTWITHSTANDING the title of this little book, which in itself is rather ambiguous, Mr. Miller has not attempted to give a précis of the advances in our knowledge of the diseases which come within the domain of laryngology. The greater part of the book is occupied by the problem of inflammation of the tonsil. Mr. Miller has provided a good and lucid discussion of the anatomy and physiology of the tonsils, and of most of the questions which arise in connexion with the operation for their removal. We can heartily recommend this portion of the work to the notice of the student and practitioner. The two final chapters consist of notes on a variety of subjects, acute tonsillo-pharyngitis, septicæmia of tonsillar origin, quinsy, Vincent's disease, palatal adhesions, elongated uvula, and malignant disease of the tonsil and soft palate. The subjects are mostly treated in too short and summary a fashion to make the information of great value. There is an adequate bibliography at the end of each chapter.

The Medical Treatment of Disease

Fourth edition. By R. D. RUDOLF, C.B.E., M.D., F.R.C.P., Professor of Therapeutics in the University of Toronto. University of Toronto Press. 1934. Pp. 540. $4.

Prof. Rudolf's book on treatment has the particular merit of individuality, and in the fourth edition this quality is fully maintained. Many parts have been rewritten and some few additions have been made. It is easy to believe that the number of references given show little relation to the number consulted, for very little of importance appears to have escaped the author's eye. Many students will be grateful for little touches that will help them to fix a clinical picture in their minds. As in previous editions,

treatment of each condition is considered under the headings Diagnosis, Environment, Diet, Specific Treatment, and Symptomatic Treatment; it is good to see sufficient emphasis laid upon the first three of these. At the same time drug treatment is fully covered and many alternative preparations and prescriptions are supplied.

Prof. Rudolf is to be congratulated once more upon giving a full and clear account of modern therapeutics for students or practitioners. If he has at times erred on the side of dogmatism he has at least gained thereby on the side of clarity.

Lectures on Medical Electricity

By ELKIN P. CUMBERBATCH, M.A., B.M. Oxon., D.M.R.E. Camb., F.R.C.P., Medical Officer in Charge, Electrical Department, and Lecturer on Medical Electricity, St. Bartholomew's Hospital. London: Henry Kimpton. 1934. Pp. 236. 6s.

ALL those who are responsible for teaching the medical student know how difficult it is for him to devote enough time to the many specialised departments of a big teaching hospital. In these collected lectures Dr. Elkin Cumberbatch, whose electrical department at St. Bartholomew's Hospital is a model of efficiency, has attempted to guide the student through many pitfalls, for a little knowledge of this elaborate subject can be dangerous indeed. In 12 lectures, each followed by a scheme of practical demonstrations, the author takes in turn the various currents, their methods of use both medical and surgical, and the different conditions which may be benefited by them. Electrical reactions of muscles and nerves as an aid to correct diagnosis in nerve injuries and nervous diseases occupy two lectures; the chapter on rays, their actions and contra-indications, may, we hope, prevent the reader from ever reaching a stage in later life when he regards this form of treatment as a last resource for his failures. The lectures are interspersed by notes in small print briefly summing up the salient points; these notes are consecutive and tell such a connected story that the less industrious could acquire useful information by reading only the small print passages.

This excellent book should be of great benefit not only to the student, but also to the practitioner who wishes to revise his knowledge of the technique of the treatments he prescribes.

The Practice of Absorption Spectrophotometry

Second edition. By F. TWYMAN, F.R.S., and C. B. ALLSOP, N.A., Ph.D. London: Adam Hilger Ltd. 1934. Pp. 144. 12s. 6d.

THE subject of absorption spectroscopy, on which spectrophotometry is based, has assumed such importance in both theoretical and applied chemistry that a completely revised edition of this book has been called for, although it is only about two years since the first edition was published. The present book is divided into two parts, the first of which contains an introduction to the theory of absorption, including a simple description of molecular spectra, and an account of various typical applications of absorption spectroscopy in which the interests and requirements of the theoretical, industrial, and biological chemist have each been kept in view. In the second part the technique required in photometric measurements of absorption is described and explained. A chapter in this section discusses the conditions necessary for obtaining accuracy in the various types of measurement involved and is of primary importance. The instruments described are those made by Messrs. Adam Hilger Ltd.; it is inevitable that this should be so, as the design and development of such instruments are largely due to this firm and to their distinguished head, Mr. F. Twyman, F.R.S., who is part author of the book. Spectrophotometry is now carried out in the ultra-violet, visible, and infra-red regions of the spectrum, and it will be appreciated that the optical components for each have to be made of materials that transmit the particular type of radiation employed.

The chapter on the nature of absorption is of special interest even to the reader who has no more than a general knowledge of physics. It indicates the problems that may arise, and is suggestive enough to stimulate those who are looking for new methods of attack. One chapter is devoted to the detection of poisons and the control of purity in foodstuffs. The well-known work on the irradiation of ergosterol and on carotene are also examples of applications of spectrophotometry. The book may be commended to workers already engaged in absorption measurements, and to students it should prove invaluable in helping them understand both the theoretical and the technical sides of an interesting subject.

Franklin Paine Mall

By FLORENCE R. SABIN. Baltimore: Johns Hopkins Press. 1934. Pp. 342. With 8 portraits. 12s. 6d.

A PLEASANT and readable account by an old colleague of the man who did so much to establish the study and teaching of anatomy and embryology in America on sound lines. Mall was born in America of German parents in 1862 and after good spells of work under His and Ludwig he taught anatomy at Clark and Chicago Universities until he was translated in 1893 to the Johns Hopkins, which was then beginning the reform of medical education in the United States with a most distinguished and effective staff. Here he remained till his death in 1917. In education he stood for liberty; he reduced the time spent on anatomy to one half of what it had been and was more interested that his students should learn what standards were possible than that they should acquire a mass of facts. In his own work he is best known for his researches on the structure of the liver, spleen, and heart, and on reticular connective tissue; his constant interest in embryology culminated in the foundation of a special department of the Carnegie Institution. Through his pupils and colleagues and his active interest in educational questions his influence spread very widely and he rose to a well-deserved prominence. The tale is well told but we should have been glad to hear more of the man apart from his work.

Traité de médecine des enfants

Publié sous la direction de P. NOBÉCOURT et L. BABONNEIX. Secrétaires de la rédaction: J. CATHALA et J. HUTINEL. Tomes IV. et V. Paris: Masson et Cie. 1934. Pp. 956 and 876. Fr.150 per vol.

THE publication of these two volumes completes the new French system of pædiatrics, the previous volumes of which have already been reviewed. The fourth volume concludes the section devoted to

diseases of the digestive tract, and deals with genito-urinary and bone diseases, intoxications, dermatology, ophthalmology, and psychiatry. The fifth volume is devoted to neurology, therapeutics, and contains the general index. As in the rest of the work, considerable attention is devoted throughout to the pathology of the conditions described, and the illustrations are profuse. The section devoted to peritonitis, and the examination of the abdomen in childhood, is particularly full, though, curiously, no reference appears to be made to the possibility of infection by the genital route in pneumococcal peritonitis. The section on liver (always something of a stumbling-block) is less good; a number of tests of liver function are confidently described, although experience in this country and elsewhere has hardly endorsed their value. The outstanding feature of these two volumes, if not of the whole work, is undoubtedly the section on neurology, which is probably unequalled in any system of pædiatrics of this kind. J. Lhermitte and L. Babonneix, who appear to be responsible for the greater part of this section, are to be congratulated on the wealth of clinical and pathological material on which they have drawn. There are some odd discrepancies in the allocation of space. Epilepsy, for instance, is described and discussed at very considerable length, but the treatment, which after all most closely concerns the practising pædiatrician, is dismissed in 10½ lines, with only the briefest reference to the experience that has been gained during the last ten years in the use of ketogenic diets in this disease.

As we have previously noted, the least satisfactory feature of this important work is the collection of references to the literature, which are often inaccurate and mostly incomplete, and do not appear to have been compiled on any consistent plan. Apart from this, the matter, arrangement, and production of the whole system deserves high praise.

A Soldier in Science

The Autobiography of BAILEY K. ASHFORD. London and New York: George Routledge and Sons, Ltd. 1934. Pp. 425. 12*s.* 6*d.*

IN this book Colonel Bailey Ashford, a sympathetic record of whose life appeared in our obituary columns last week from the pen of Colonel Clayton Lane, sets out here the story of the discovery with which his name is honourably connected, prefacing it with interesting family details. He is able to trace back 300 years an English pedigree remarkable on the mother's side by the observation of those traditions of essential Puritanism which led to the original emigration of his ancestors and their similars. Bailey Ashford joined the medical service of the American Army in time to be sent to Puerto Rico during the Spanish War, and, almost by accident, arrived at the true origin of a widespread condition of anæmia in the island, the condition appearing almost to be the normal road to death, so prevalent was it. Under a section entitled Arms and the Microscope he describes the first campaign against the disease, and the vivid nature of his personal narrative brings out the drama of a story of scientific research being interrupted by the official duties of a medical officer with the army. Ashford attributed the success of the campaign against hookworm disease in Puerto Rico, which followed upon the discovery of its origin, to the proselytising work of those who had been cured. The majority of such patients could not read or write, but by word of mouth they expatiated on their cures, and within five years of the discovery the United States legislature passed a Bill appropriating a substantial sum of money to the carrying on of the remedial work. Other chapters deal, in the same vivid manner, with the author's activities in Europe during the war, where he organised a school for medical officers at Langres, and in this connexion visited British hospitals and dressing stations on the Western Front with results which enabled him to make many picturesque and sometimes very humorous comments. The book is interesting, unconventional, and amusing, and the autobiographer introduces himself, always modestly, as one we should like to have known.

Common Skin Diseases

Second edition. General Practice Series. By A. C. ROXBURGH, M.A., M.D., B.Ch. Camb., F.R.C.P. Lond., Physician to the Skin Department, St. Bartholomew's Hospital, London: H. K. Lewis and Co., Ltd. 1934. Pp. 370. 16*s.*

IN the second edition of this admirable little text-book chapters on congenital affections of the skin, atrophy, sclerosis, and on the vesicular and bullous eruptions, which had been written, but for some unstated reason omitted in the first edition, are inserted and complete an efficient piece of work. It is practical, up to date, breezily written, and based, not on the writings and opinions of others so much as on the observation and experience of its author. The astute selection of and excellent reproduction of many illustrations is another good feature. Among these the three half-tone photomicrographs (pp. 131 and 133) are noteworthy as an object-lesson in the characteristics of the ringworm mycelium, showing how completely it differs from the fat droplets, with which, by the novice, it is often confused. It is essential that every physician who has to deal with diseases of the skin should know how to make and interpret simple microscopic examinations for diagnosis, and those who are not in constant practice will be glad to have such reminders as are here supplied.

The Casting of a Pebble

By ELSIE GREY TURNER, author of "Earnest Earth." Newcastle-upon-Tyne: Andrew Reid and Co., Ltd. 1934. Pp. 310. 8*s.* 6*d.*

THIS is a book of travel in which an observant woman, well read and a linguist, has set down the impressions derived from visits to Spain and Scandinavia, Poland and Czechoslovakia, Hungary and Italy; the object of the book is revealed on the title-page in a quotation from the words of Napoleon: "Whoever troubles the peace of Europe wants civil war." The times we live in are such that any appeal to our minds or our interests, supplying arguments for international arbitration rather than sabre-rattling, clearly justifies its appearance. These vivid and discursive chapters pretend to no particular medical interest, but doctors and others will find in them material for thought and amusement.

THE PATIENT AND THE WEATHER.—We reviewed recently (Nov. 3rd, p. 991) a book by Dr. W. F. Petersen under this title, and we have now heard from the publishers, Messrs. Edwards Brother, Inc., Ann Arbor, Michigan, that the price is $5.

THE LANCET

LONDON: SATURDAY, NOVEMBER 24, 1934

ASTHMA REVIEWED

OPINION has changed a good deal since the days when asthma was regarded as a neurosis or as a symptom of nasal abnormality. It is now generally accepted that the disorder is a clinical entity and not a syndrome of varied ætiology; that it has a close connexion with conditions such as hay-fever and eczema, a connexion based on hypersensitiveness to common proteins; and that these diseases often run in families. Perhaps the pendulum has swung too far and the hereditary and constitutional aspects have been overstressed. Investiigatons by Dr. R. S. BRUCE PEARSON mentioned in the latest report of the Asthma Research Council [1] show that latent allergy and the tendency to develop protein hypersensitiveness can not infrequently be demonstrated in apparently normal people, and it would therefore be unreasonable in the treatment of asthma to concentrate attention entirely on such hypersensitiveness, or to neglect the factors which may determine the presence or latency of symptoms. In drawing attention this year to the value of physical exercises for asthmatics, the Council issues a pamphlet [2] containing details and illustrations which ought to be really helpful to practitioners. Ordinary breathing exercises, whose object is to increase the expansion of the chest, are of no use in asthma, since the lungs are already distended too much, and the aim is to restore the lungs and chest cavity to their normal size. The exercises recommended are designed to teach the patient to empty the lungs, to use the lower part of the chest as well as the upper part, and to employ diaphragmatic breathing.

From Guy's Hospital interesting results are reported from a psychological study of asthmatic children. Tests confirmed the general impression that they tend to be of superior intelligence, unusually high intelligence quotients being obtained in some of them. In none of the cases studied was there evidence of marital disharmony, and in this they differ from "problem children," who seem often to be the product of strife in the home. Asthmatic children are usually over-protected and fussed by their parents and the attacks are induced by a state of anxious expectation. The attacks almost always cease when the children are taken away from home, but recur as soon as they come back—even at the railway station. Hence it is not surprising that very satisfactory results are reported from psychological treatment. In the field of specific therapy the treatment of hay-fever has been improved, the injections of pollen being controlled by skin tests and the aim being complete desensitisation of the patient. Practically all cases of hay-fever can now be relieved. Much larger doses of pollen are used than formerly, but provision has been made for adequate supplies for treatment in the future. It is suggested that in asthma the majority of the patients are sensitive to proteins which they are constantly breathing, such as house-dust, feathers, orris-root (face powder), pollens, and horse and other animal hairs; and this suggestion appears reasonable when we consider the relief obtained by air-conditioning, as developed by VAN LEEUWEN. Efforts to desensitise asthmatics by the injection of a mixed solution of the common inhalants have been attended by a certain measure of success, but the dosage is still empirical and the skin reactions are rarely influenced by the treatment. Sensitisation in asthma is so commonly multiple that it is doubtful whether any generally practicable treatment will be evolved along these lines.

The clinician to-day is largely dependent on the laboratory worker for inspiration, and it is good to see that work is being carried out on the mode of action of adrenaline, and on the chemical changes at the nerve-endings in the bronchi. The advisability of a massed attack on a single disease, such as the Asthma Research Council is directing, is always open to doubt. It is true that rickets and several tropical diseases have yielded to a similar attack, but there can be few so sanguine as to believe that ten years of directed research on peptic ulcer or hyperpiesia or epilepsy would necessarily solve the problems of these diseases, and the same is true of asthma. Nevertheless the Council has reason to be well satisfied with the investigations it has inspired and with the treatment given at its clinics. Readers of the present report will look forward to the summary of research work carried out under its auspices since its inception in 1927, which is promised from the pen of Sir HUMPHRY ROLLESTON. Meanwhile, it appears that the problem has been clearly outlined in its clinical aspects and that attention is now turning more exclusively to therapeutic procedures. Asthma is a very common disease, and now that the research clinics are becoming widely known and the value of their investigations is appreciated, there is perhaps a danger of their attracting too many patients and having too little time for the specific research purpose for which they were founded. Be this as it may, the public must certainly not be allowed to forget that the Council depends on voluntary contributions for the continuation of its valuable activities.

[1] Copies of the report may be had free from the Secretary of the Asthma Research Council, c/o King's College, Strand, London, W.C.2.

[2] Copies of this pamphlet are obtainable for 2s., post free, from the secretary of the Council at King's College.

ROBERT MORANT [1]

ALL should know about ROBERT MORANT, and the delay in publishing his life, brought about by circumstances which seemed regrettable at the time, has proved fortunate. For when he died only what he had done could be enumerated, but reading his record 14 years later we see in due

[1] Sir Robert Morant. By Bernard M. Allen, M.A., LL.D. London: Macmillan and Co., Ltd. 1934. Pp. 311. 12s. 6d.

proportion the greatness of the tasks which he discharged, and recognise the fruitful results. We can appreciate also how, in the varying milieux where his duty lay, two aspirations were consistently dominant—the introduction of order and discipline into public affairs, and the placing of the general weal in front of all things.

MORANT was by tradition, inclination, and home influence a deeply religious lad. At Winchester and Oxford his intention to take Holy Orders was maintained, and a high place in the theological tripos seemed to confirm it. But the young man, honesty exemplified, felt that he could not sufficiently subscribe to doctrine to become a minister. Yet his academic honours, worked for with that object and often under great strain, were a direct passport to no other vocation. No doubt disappointed, he became an assistant master in a private school, continued voluntary work among the poor which he had taken up from boyhood in response to his religious bent, and held various private tutorships. He threw himself with zest into his duties, and these, despite their limited sphere, gave him rooted belief in the value of early training for the individual and systematic education for the State; and he perfected now a natural gift for sympathy with the young. And this last it was that provided him with a curious opening. For through the influence of a parent of certain of his pupils, who had detected his unusual qualities, he found himself tutor in a Siamese noble family, and shortly afterwards the education of the Royal children was confided to him. This led him to formulate a complete scheme of education for Siam, and also involved him in the political affairs of the country, so that he became a confidential adviser of the Government with no really defined status. Suddenly, when it seemed that his life work might lie in Siam, the domestic politics of that country were involved in the foreign politics of France and England; MORANT had to resign from his informal position, when the collapse of the educational scheme, to which he had given over five years of devoted work, followed. He returned to England with a knowledge of the theory and practice of education, based on fundamental creative labour in Siam added to experience at Winchester and Oxford, but, as at the end of his Oxford career, there appeared to be no outlet for his gifts and energies. And again the opening arrived in a curious manner. He was selected for a subordinate post in the Board of Education on the excellent, if uncommon, grounds that he possessed the necessary equipment for the vacant post. Proof of these he began to furnish at once, and in a brief space of time he was found on all sides to know more than anyone else concerning the difficulties ahead of educational reform—to have large vision and a colossal grasp of fact, backed by tireless industry. The biographer describes in dated detail the Parliamentary activities associated with national education from 1895 for the next 12 years, and this exact chronicle of political and departmental manœuvring and accomplishment is justified, for throughout the narrative MORANT appears as the man who was invariably turned to for the introduction of order into chaos. In every phase of negotiations in which political obligations and sectarian influences played their part, the advice of MORANT was relied on, and, turn as events would, he kept a direct line towards the main objectives while dealing capably with side issues. The Education Act, 1907, resulted, and at the Board of Education the swiftest promotion on record in the Civil Service found MORANT head of his department eight years after the start in Government service.

Yet a third time there came an unlooked for break in MORANT'S career. A chance indiscretion in the midst of a political upheaval laid him open to the attacks of politicians and teachers, and the devotion which he had shown for education was forgotten. MORANT, after nine years in developing the work of his department in accordance with the high aspirations of himself and of many others, found it necessary to leave the Board and begin again from the beginning. The closing phase of his life is the one which brought him into intimate connexion with the medical profession, and again the opportunity was as unexpected as had been the Siamese appointment and the entrance into the Civil Service. Mr. LLOYD GEORGE requested him to take the responsibility of bringing the new Insurance Bill into operation, and appointed him chairman of the National Health Commission. Mr. ALLEN'S story closes with a short summary of the circumstances which led up to the Medical Insurance Act and the amending Act of 1913. Here we see MORANT countering the impending paralysis of the new legislation owing to the upheaval of war; we see him working for the establishment of a Ministry of Health; and we can identify in all that is set down the same MORANT giving play to his ideals, the introduction of order and discipline, and the promotion of the public good. While the revolution in medical practice, to which it now became his duty to give effect, was misunderstood by many and repugnant to a large proportion of doctors, MORANT recognised at once that the substantial coöperation of the medical profession would be needed. Now to them he was an unknown man; he was mistrusted, almost feared, as an instrument for introducing Government tyranny. Those who were in medical practice at the time will remember the bitter controversies which centred around the institution of medical insurance, but they will remember also how the medical profession found in MORANT not a bureaucrat or an arrogant official but a sincere friend, one who understood the difficulties in which professional life was going to be placed, one who shared with them a sincere desire to give adequate medical service to one-third of the population who had never experienced its benefits, and one who was as clear as themselves as to the value of medical research. His sudden death at the age of 57 was directly associated with the unabating strain of work conducted in the intense manner which was the only manner that he knew. He had lived a consistent life. The sense of duty displayed as a youth, and the enjoyment of fighting which had characterised the young man, were till

the end with him. When he died the feeling of the whole medical profession was that a friend had been lost to them.

CANCER CELLS UNDER IRRADIATION

As radiotherapy develops it becomes increasingly evident that we are still far from understanding the way in which it acts. To see a tumour of the skin disappear under the influence of relatively small doses of radium or X rays, leaving behind an almost normal surface, is to receive a vivid impression that malignant cells are especially sensitive to irradiation. Yet this idea had to be abandoned when it was found that many tumours do not readily react to the rays, while the large doses which do affect them will also damage the adjacent normal tissues. As Dr. MAX CUTLER has lately written: "It is quite evident that the response of tumours to irradiation is governed by a group of factors including physical, histologic, physiologic, pathologic and clinical, which in combination with one another determine the ultimate result. The failure to recognise the relative importance of all the principles that influence the ultimate result may lead to errors in interpretation of radiophysiologic phenomena." [1] It is clear that an investigation of these different factors is necessary for the further development of radiotherapy, and it is fortunate that the spontaneous and the transplantable tumours of mice and rats present material eminently suitable for their experimental examination.

The Eleventh Scientific Report of the Imperial Cancer Research Fund (p. 1185) records continuation of those inquiries into the action of radium which occupied the greater part of the tenth report published two years ago. The study of the regression of transplantable tumours under the influence of radium, then described by Dr. W. CRAMER, has been extended by him to the spontaneous mammary tumours of the mouse, which, like the corresponding human tumours, show great differences in radio-sensitivity. The process of regression of the radio-sensitive spontaneous tumours is found to be identical with that described for transplantable tumours, and this removes the objection often made that observations on transplantable tumours do not apply to those arising de novo. In the latter there is again evidence of a partial damage to the malignant cells—damage, however, not sufficient in itself to be directly lethal. This partial damage is followed by a macrophage invasion of the irradiated tumour, leading to an overgrowth of young connective tissue which eventually displaces the tumour parenchyma completely and thus effects a cure. In the radio-resistant growth, irradiation is followed by an arrest of growth indicating damage to the malignant cells, but the macrophage invasion and the subsequent overgrowth of the connective tissue is less complete, or may even fail altogether, so that a nodule of malignant tissue is left behind in what may be called a dormant condition. When a comparison is made between the histological structure and the reaction to radium it is found that, as in human beings, the more differentiated type of growth is usually radio-resistant, although there are some exceptions to this rule. The question of radio-resistance is thus narrowed down to the question why, in some types of tumours, the connective tissue reaction fails to appear. Dr. CRAMER points out that one of the fundamental differences between cancer cells and the cells of normal epithelium is the altered relation of the parenchyma to the connective tissue, and that the disappearance of a malignant growth may be ascribed to a disturbance of this relationship. In the radio-sensitive tumours the dominating influence which the unrestrained malignant cells exert on the stroma is weakened when they are damaged by irradiation, so that the stroma now overgrows the still viable but damaged parenchyma. Why in the more highly differentiated radio-resistant types of tumours the damaged parenchyma retains its dominating influence is a question still to be answered.

Through irradiation a radio-resistant tumour may cease to grow—its malignant cells being temporarily dormant—but sooner or later there will be a recurrence because the cells will recover. This type of recurrence, it is pointed out, must be clearly distinguished from that due to a new process of carcinogenesis. It is known from experimental studies that if a large area has been subjected to chronic irritation, a single malignant new growth will usually arise in a sharply circumscribed area. But this tumour is surrounded by an area of tissue in a precancerous condition, and when the tumour itself is excised another one may arise in the precancerous area left behind. The same thing happens when a tumour is treated with radium in such a way that the (possibly precancerous) neighbouring tissue is left untreated; the tumour itself will disappear but new ones may subsequently make their appearance in the non-irradiated area. This event is responsible for some of the apparent failures of radiotherapy, and it can be avoided by wide irradiation in cases where it is likely that a tumour has developed as the result of chronic irritation extending over an area bigger than that occupied by the tumour itself. The observations on spontaneous tumours confirm the conclusion, reached from experiments with transplantable tumours, that the effect of irradiation is entirely local. If there are two tumours and only one is irradiated, the irradiated tumour alone will regress and the other will go on growing.

A further analysis of the process of regression is made possible by irradiating cancer cells in vitro and then transplanting them. One can thus isolate the direct effect on cancer cells from the effects due to the subsequent reactions. By this method Mr. H. G. CRABTREE and Dr. CRAMER have been able to show that the sensitivity of a malignant cell to irradiation is not, as was formerly believed, a fixed and inherent property of the cell, but can be varied experimentally within very wide limits. By altering the conditions under which they were irradiated it was found that the radio-sensitivity

[1] Jour. Amer Med. Assoc., Oct. 20th, 1934, p. 1204.

of malignant cells depends on the functional condition of their respiratory mechanism. When this mechanism is in the oxidised phase the cell is radio-sensitive; contrariwise, when it is in the reduced phase the cell is highly radio-resistant. This explains the clinical experience that in patients suffering from anæmia a tumour does not react well to irradiation, and admits at once of the important practical conclusion that an ample blood-supply to the tumour is essential to successful treatment. It also suggests possibilities of enhancing the radio-sensitivity of tumours by substances or agencies which act on the respiratory mechanism. Curiously enough, changes in the glycolytic mechanism, which distinguishes cancer cells from normal cells, were found not to affect the radio-sensitivity, and such factors as changes in the hydrogen-ion concentration, or in the amount of glucose present in the medium, left the sensitivity unaltered. One important theoretical conclusion which can be drawn from these results is that the primary damage done to a cell by irradiation is done through the respiratory mechanism. Since the conditions which alter the sensitivity towards beta rays also alter its reaction to gamma rays, it follows that the biological effect of gamma rays on cancer cells in vitro is essentially the same as that of beta rays. In a further communication Mr. CRABTREE shows that the respiration of tissues, whether normal or malignant, when kept in a Ringer solution buffered with a phosphate solution, is not as efficient as when the medium is buffered with a bicarbonate solution—indicating that the phosphate Ringer solution damages in some unknown way the respiratory system. Again, it was found that the effect of radium on cancer cells kept in a phosphate-Ringer solution is greater than on cells kept in a Ringer-bicarbonate solution.

Dr. E. S. HORNING has studied the changes in the inorganic constituents of cancer cells by the method of micro-incineration. It is possible in this way to obtain a picture which gives with astonishing clearness the distribution of the inorganic salts within the cells. He finds in the first few hours after irradiation a slight but definite increase in the ash distribution, which he ascribes to a direct effect of radiation. Later the cells which become enlarged and multinucleated and are evidently undergoing degeneration show an increase in the inorganic constituents which grows more and more evident; but these changes are probably attributable to a secondary effect of irradiation and due to the action of radium on the tumour bed and the subsequent reaction of repair.

ANNOTATIONS

NEW ROAD TRAFFIC LAW

THE Minister of Transport last week appointed New Year's Day as the date when Part II. of the recent Road Traffic Act will come into force. Part II. includes Section 16 which is important to hospitals and to doctors who from time to time give emergency treatment to traffic casualties. In case of bodily injury (including fatal injury) the person using the vehicle which caused the accident must, on a claim being made, pay the practitioner a fee of 12*s*. 6*d*. for each patient and a mileage fee of 6*d*. per mile for any distance over two miles. If more than one practitioner administers treatment, the first to do so will be the person entitled to make the claim. This section applies to hospitals (i.e., institutions, not being institutions carried on for private profit, which provide medical or surgical treatment for in-patients) as though hospital were substituted for medical practitioner. If the accident is due to the negligence of some party other than the vehicle-user, the latter is entitled to recover from the negligent party the amount which the new law requires to be paid to doctor or hospital. Doctor and hospital can recover the statutory fee as a simple contract debt.

Other important sections in Part II. are those which try to make insurance more water-tight. The public has had the impression, since the Act of 1930 was passed, that any persons injured by a negligent motorist would always be able to recover damages by means of the system of compulsory insurance. The insurance companies, however, issued policies containing various conditions and restrictions, and naturally declined to pay the policy-holder if the conditions or restrictions were infringed. The proprietor of a garage and motor-car repairing business, for instance, might have insured his private car under a policy which stipulated that the car should not be used for the purpose of the business. If a pedestrian was negligently run over by the car when it was being used to tow a customer's broken-down car to the garage for repair, the company would refuse to pay on the policy and the injured pedestrian would suffer in consequence. In future it is to be the duty of the insurance company to satisfy judgments against persons insured for third-party risks. If policies contain any limitations as to the age or the physical or mental condition of the driver, or as to the condition or horse-power or value of the car, or as to the number of persons or the weight carried, or as to the use of a wrong identification mark, those limitations will be void after Jan. 1st. Naturally the insurance companies, which do not conduct their business for purely altruistic purposes, will expect to be entitled to raise premiums to cover the increased liabilities. The new tariff will doubtless be published in due course. The companies which are authorised to conduct this kind of third-party risk insurance have announced that there is no need for a policy-holder to return his existing certificate or to communicate with the company as to the conditions applicable after Jan. 1st. If he receives no notice from his insurance company, he can assume that an existing certificate which runs after New Year's Day will require no alteration and will be valid for all the purposes of the new Act.

DEFICIENCY SYMPTOMS IN CHRONIC GASTRO-INTESTINAL DISEASE

COMPARISON of the outstanding features of experimental deficiency diseases with those of certain long-recognised but obscure general diseases not known to be associated with dietetic defects has gradually been followed by the explanation of many resemblances previously mysterious; the discovery of underlying intestinal defects in many of these obscure disorders has explained how they may be due to faulty nutrition, even though they develop on a satis-

factory diet. "Starvation in the midst of plenty" was the phrase applied by Izod Bennett, Hunter, and Vaughan in their study of such defects in cœliac disease; "conditioned deficiency diseases" is an illuminating description recently used by L. J. Witts in writing on the nutritional anæmias. Such phenomena as the hyperchromic anæmia seen in some cases of gastrocolic fistula, or the secondary anæmia which is often a serious sequel to the excision of large portions of the stomach are examples of these diseases. The concept is probably widely applicable and it seems likely that there are many forms of chronic intestinal disease in which the symptoms and signs extend far beyond the local site of disorder. Thus in a recent paper[1] Dr. J. Goudsmit of Zaandam describes a series of cases of chronic gastro-intestinal disease associated with anæmia, diminution in the tendon reflexes, and frequently spondylonychia or loss of the surface epithelium of the tongue. Some of his patients had complete achlorhydria, while in others the gastric secretion was normal. In a few of them abdominal pain was the presenting symptom, but in the majority there was a vaguer chronic intestinal disturbance which could only be defined as "stomach trouble"; flatulence, occasional diarrhœa, bouts of vomiting, and a constant feeling of fullness were symptoms present in varying degree from case to case, the clinical picture being dependent much more on the remote signs and symptoms than on what could reasonably be considered the underlying cause.

Such clinical observations leave many fundamental problems unsolved; it is clear that until we can say in any particular case whether the deficiency arises from a primary fault of the absorbing mechanism of the gut or whether an artificially created steatorrhœa prevents adequate absorption of the products of digestion, we cannot sufficiently explain the results. Similarly, until the experimental biochemist can provide more exact information about the ultimate primary accessory factors in our food and the effects of their deficiency we shall not be in a position to say which of these factors are lacking in these complicated cases. Allowing for these limitations, however, the immediate importance of clinical observations such as Goudsmit's cannot be questioned.

EPSOM COLLEGE

THE Governors of Epsom College have been approached cogently by Sir Raymond Crawfurd, Chairman of the Council of the College and asked to bring the claims of the College before those who might support the institution. Certainly the need for an increase of income is pressing; there are, for example, 55 applicants for the pensions, only 3 of which are vacant, and in the majority of these cases the applicants have only the old age pension and perhaps a small grant from the Royal Medical Benevolent Fund on which to live. There are again more orphan sons of medical men seeking admission on the Foundation than room can be found for, while the Council have only this year increased the number of Foundationers from 50 to 56 at an enhanced expenditure of little short of £1000 per annum. The College receives from the medical profession a generous annual income and the value of benefactions, about £10,000 per annum, is three times larger than the assured income, out of which of course administrative costs and debenture interest have to be paid. The meaning of this is that to meet the growing pressure money from bequests has been utilised for immediate needs instead of being invested. There is, therefore, real need for special effort to enrol more governors, and the claims of the College to public support will, it is hoped, be advocated by the governors. Sir Raymond Crawfurd's letter is accompanied by a list of donations and subscriptions to the College corrected up to Dec. 31st, the cost of publication being assisted by the Medical Insurance Agency. The Governors have all received a copy of the list, and to those of them who are medical men or women it is suggested that the list should be allowed to lie on the waiting-room table.

[1] Nederlandsch tijdschr. v. geneesk., 1934, lxxv., 3123.

TESTS FOR RESPIRATORY EFFICIENCY

Dr. Alan Moncrieff has attempted to devise a test for estimating the efficiency of the respiratory system, comparable to those which are used for renal function. In the historical introduction to his thesis[1] he gives good reasons for choosing six of the available tests for detailed investigation, taking into account not only the likelihood of their yielding useful data but also their expediency; all of them can be completed in five to six minutes, and require only a special type of spirometer and a mercury manometer. Four of the tests are measurements, simple or calculated, and two are so-called performance tests[2] in which the patient is required to make a voluntary effort in the shape of first blowing up, and then sustaining, a column of mercury. Of the measurements one, the vital capacity, may be considered as anatomical in nature, and the other three as physiological; the first of the latter gives the amount of pulmonary ventilation required for the intake of 100 c.cm. of oxygen, the second the proportion of inspired air in each respiration which does not come into contact with the functional respiratory surface of the lungs (dead space), and the third the relation of duration of expiration to duration of inspiration. The difficulty of obtaining reliable normal values for the tests is discussed, and reasons given for selecting the standards used in this investigation. The tests have been performed on 86 hospital patients, and, including repetitions, 90 complete sets of results are presented. The patients are classified clinically into five groups—good, fairly good, fair, poor, and bad—on the basis of their apparent degree of "respiratory failure." A separate table is devoted to each group, giving the numerical result of each test on every patient in that group; the results of each test are then averaged for each group, and the figure recorded in a sixth table. All of these averages fall below the accepted normal standards, and in the case of three of the tests—namely, the vital capacity, the ratio of dead space to tidal air, and the manometer-endurance test—they show a progressive falling off from the normal as the groups are taken in order. In the remaining three tests, they appear to bear no constant relation to the clinical condition of the patients. So far the investigation is highly satisfactory. There is no doubt, on theoretical grounds, about the excellent choice of tests, nor that when a number of cases are taken together the average results of at least three of them agree with the clinical findings.

Nevertheless, the purpose of the inquiry is presumably to see if it is possible to approach the individual patient with certain tests, and classify him according to the figures obtained. To do this, on the present data, one would have to assume, for instance, that 76 per cent. of the normal vital capacity is typical of the "fairly good" group, 69 per cent. of the "fair" group, and so on according to Moncrieff's averages, so that patients yielding vital capacities of 74 per cent. and 71 per cent. would be noted respectively as "fairly

[1] Med. Research Counc., Spec. Rep. Ser. No. 198. H.M. Stationery Office. Pp. 62. 1s.

[2] The advantages and disadvantages of such tests are discussed by Prof. E. C. Schneider in his "Physiology of Muscular Activity," reviewed in THE LANCET, 1933, ii., 978.

good" and "fair." We have gone through the figures given for the three tests mentioned above as most promising in the case of each patient, and recorded in respect of each the group into which he falls.

In 44 out of 90 cases, each test puts the patient into a different group, so that these individuals are unclassifiable. In five of the remaining cases all the tests agree, but the group to which the patient is in consequence allotted agrees with his clinical grouping in only three instances; in the other two he is wrongly placed. In 41 cases two out of the three tests agree, but only in seven does the patient fall into his correct group on this criterion; in the other 34 he falls into a different group. Therefore accepting the clinical classification as correct—which, of course, it may not be—only ten patients, on the basis of the tests, fall into the right group; 36 fall into the wrong group, and 44 cannot be grouped. On these grounds we cannot go all the way with Dr. Moncrieff when he says that "some objective estimation of the degree and type of respiratory inefficiency can be made, and the future use of this in certain branches of medicine and surgery is indicated." One possibility, inherent in this statement, has not been overlooked. The result of each individual test may be assumed to have a special significance, so that a patient could be grouped according to one test only; that is, he might be "good" on two scores, but only "fair" on the other, and it might be thought justifiable to classify him as "fair" on account of a particular type of respiratory failure. The three tests we have investigated yield for the 90 cases a total of 253 tests (in a few instances no result was obtained), and of these only 59 (23 per cent.) agree with the clinical classification.

It would be difficult to devise tests which should, on physiological grounds, give a better interpretation of the functional capacity of the lungs for gaseous transfer, than that dealing with the amount of ventilation necessary for a given oxygen intake, and that determining the relation of dead space to tidal air. If these are reliable, and the clinical estimate of the patients is reasonably accurate, then we must look elsewhere for the serious lack of agreement between them when individual cases are considered. This may be found in a consideration of the following points, although to turn them to practical advantage would be no easy matter. The ultimate demand for oxygen is made by the tissues themselves, and may be satisfied in several ways—for instance, by increased ventilation, by a quicker blood flow, by an increase in the amount of hæmoglobin, or by a greater utilisation of the existing supply. We know that venous blood is normally far from completely reduced; if the tissues reduced it completely, they would materially increase their oxygen supply. It is possible therefore that if the capacity of the lungs is impaired, the resulting oxygen deficiency might be made up by the hæmopoietic and cardiovascular systems, so that there might be few clinical grounds for stating that a patient was suffering from respiratory failure. The functional tests, applied to the lungs alone, might at the same time indicate serious deficiency. An analagous case is the detection of a valvular lesion of the heart, with few general symptoms. If the tests recorded in this report could have been correlated in some way with cardiac output, hæmoglobin percentage and degree of oxygen saturation of the venous blood, their value might have appeared much greater. Prof. J. Barcroft in a recent book [3] has emphasised this well-known factor of "integration" when adaptation to abnormal conditions becomes necessary; not one, but many modifications of function contribute to the final result, which theoretically might have been attained by one only.

To sum up. In this report Dr. Moncrieff gives an impressive account of an excellent and very necessary research, but we feel that the conclusions to be drawn from it are at present negative, and that the practical application of the results as they stand would be injudicious. On the other hand, there is ample reason for believing that the further elaboration of such results in the preliminary investigation stage might vindicate the practical value of some of the methods and render them of even greater significance than the author is inclined to claim for them.

[3] "Features in the Architecture of Physiological Function," reviewed in THE LANCET, July 14th, 1934, p. 89.

UNION THÉRAPEUTIQUE

As a result of the French Therapeutic Congress of 1933, the Union Thérapeutique came into being under the auspices of the Société Thérapeutique de Paris. By statute this is an international association of doctors and biologists specially occupied with questions of treatment, its objects being to establish regular contact between its members, to encourage research and to aid the exchange of ideas, theses, and books. In October of each year will be held a general assembly to study the progress of therapeutics, to discuss methods and coördinate efforts. From time to time congresses of a more general nature will be promoted, open to all doctors and biologists. The next congress will be at Berne under the presidency of Prof. Emil Bürgi some time in 1936. Original members of the Union number 250 and any others who wish to join should approach the secretary-general, Dr. G. Leven, 24, rue de Téhéran, Paris (8e), when their names will be submitted to the next general assembly. The president of the Union is Prof. Maurice Loeper (Paris), and the vice-presidents Prof. Nicola Pende (Genoa), Prof. E. Perrot (Paris), Prof. E. Zunz (Brussels), and Dr. E. P. Poulton (London).

CHANGES AT THE DENTAL BOARD

Sir Francis Acland's address at the opening of the twenty-seventh session of the Dental Board of the United Kingdom was occupied almost entirely with welcoming new members—six out of the total of thirteen were joining the Board for the first time—and with recording the services of those who had retired. Of the six new members Prof. R. J. Johnstone is the Irish representative, and Prof. D. Waterston the Scottish representative of the General Medical Council. Mr. J. M. Vallance, W.S., appointed by the Scottish Department of Health, is in charge of the division of medical services. Mr. W. L. Edwards, who represents dentists registered under the Act of 1921, is a Gloucester dentist of great experience and a member of the Dental Benefit Council. Dr. C. F. Rilot and Mr. J. A. Woods, direct representatives of qualified dentists practising in England and Wales, both hold high position in the British Dental Association and have dental education at their fingers' ends. Mr. Rilot, as deputy visitor for the G.M.C., has been to every dental school in the course of his work; Mr. Woods has examined in dental subjects in four universities. Of the retiring members Sir Francis Acland described Mr. W. H. Dolamore's record of work at the Board as unique; he had been a member of four committees since the formation of the Board, and chairman of all of them for several years. At the conclusion of his address Sir Francis alluded with pleasure to the increasing recognition of the value of work done in schools by the Board's demonstrators. He had heard a complaint that one of these visits

had led to an increase of small patients at a school dental clinic so great as to be embarrassing. The Board's work was also bringing home to education authorities the importance of having an adequate school dental service. The Board sat until Friday to deal with a rather heavy disciplinary programme.

BARBITURIC ARTHRALGIA AND MYALGIA

THE rather vague aches and pains to which the barbiturates can give rise are apparently so common that individual observers can report cases by the half-dozen. Yet it is only lately that much notice has been taken of this by-product of therapeutics. The recent crop of papers on barbituric arthralgia and myalgia no doubt reflects the familiar fact that as soon as an ailment has been discovered, cases are detected right and left. In *Presse Médicale* for Oct. 3rd (p. 1536), Dr. P. Castin and Dr. P. Gardien record six new cases. After giving details of each, they point out that the pain of which the patients complained was not as a rule associated with physical signs (changes in tendon reflexes, sensory, and vasomotor disturbances). In only one case was muscular atrophy observed. Usually the patients referred their pain to a particular joint, and its impaired functions seemed to be due to pain in the muscles round about. Several of the barbiturates were incriminated, gardenal, luminal, rutonal, and prominal being in turn held responsible for the symptoms. Rashes may occur during the first days of barbiturate medication, but pain, it seems does not come on for a considerable time. The ages of the six patients were within the narrow limits of 43 and 56 years—"the age of aches and pains." It might be supposed that patients with a rheumatic history would be peculiarly subject to this condition, but only one of the six patients had such a history. The scapular region was the favourite site of the symptoms, the other regions, in the order of frequency of involvement, being the hips, arms, metacarpophalangeal joints, knees, thighs, elbows, and legs. As a rule, the pain was cramp-like, with intolerable bouts refractory to such well-known antirheumatic drugs as aspirin, antipyrin, and sodium salicylate. A liniment composed of salicylic acid (10 g.), a 70-degree alcohol (50 g.), and castor oil (100 g.) was, however, capable of affording some relief. As for the pathology of this condition, Castin and Gardien are open-minded in their discussion of alternative pharmacological explanations.

BEQUEST TO A NON-EXISTENT HOSPITAL

THE Middlesex Hospital has won on appeal the case which it lost before Mr. Justice Bennett in June last [1] over a bequest inaccurately expressed. A Mr. Forshaw left property which, subject to a life interest, was to revert unconditionally to "The Middlesex Children's Hospital, Middlesex Street, London, W." There was no "Middlesex Children's Hospital," no "Middlesex Street" in the "W" district of London, and no hospital in any Middlesex Street in London. The Middlesex Hospital, Mortimer Street, claimed the property. There were then three courses open to the court. It could either declare that the gift should go to the Middlesex Hospital, or it could say that the gift failed (with the result that the property would go to the next-of-kin as on an intestacy), or it could apply what lawyers called the *cy-près* doctrine, in other words, if the judge found a general intention to benefit a charitable purpose and not to benefit a particular institution, he might make some order as to the disposal of the property in a charitable direction corresponding as nearly as possible to the testator's wish. Mr. Justice Bennett thought the Middlesex Hospital in Mortimer Street was not clearly enough indicated and he found no general intention to benefit a charitable purpose; so he took the second of the three courses and directed that the property should fall into the residue of the estate. The Court of Appeal, taking a common-sense view, held that Mr. Forshaw meant to benefit an existing hospital and that it was proper to support the gift for a charitable purpose if possible. The Master of the Rolls refused to reject the claim of the Middlesex Hospital merely because Mr. Forshaw described it as the Middlesex Children's Hospital. He thought it possible that "Middlesex Street" was just an inadvertent slip for Mortimer Street. Thus the Middlesex Hospital succeeds in its claim. There is legal authority for upholding a gift made to a recipient described by a nickname or an erroneous name proved to have been used by the giver. There was evidence that Mr. Forshaw took a special interest in the Middlesex Hospital. Mr. Justice Bennett seemed inclined to disregard this evidence, but laymen will probably think this element in the case was decisive.

[1] THE LANCET, 1934, i., 1405.

AURICULAR RATE IN PAROXYSMAL TACHYCARDIA

AN interesting electrocardiogram was lately published and discussed by P. D. Camp and D. Scherf.[1] It was recorded from a woman of 42 with mitral stenosis, who had paroxysms of auricular tachycardia about once a week, each lasting an hour or less. The authors were fortunate in registering, by chance, the onset of an attack. The tracing showed normal rhythm to be replaced by repeated auricular extrasystoles with a rate of 107 per minute; then without pause there was a sudden transition to an auricular tachycardia with a rate of exactly double, that is, 214 per minute, the ventricle following uniformly except for an occasional blocked beat. The interpretation suggested is that impulses arise from an irritable focus in the auricle at the rate of 214 per minute. During the period in which auricular waves are seen with a speed of half this—i.e., 107, alternate impulses are blocked within the auricle; later, all the impulses succeed in stimulating the auricle, which is driven at the rate of 214. Against the other possibility that there is in reality an auricular rate of 214 throughout is the total absence of any indication of alternate P waves buried in the ventricular complex. Neither is it easy to explain the tracing as one of auricular flutter with variable auriculo-ventricular block. Camp and Scherf appear to favour the view which explains both auricular flutter and fibrillation as originating in a single irritable focus in the auricle, the mechanism being the same as in auricular tachycardia, the difference lying in the rate of impulse formation. This is the attitude commonly adopted on the continent, while in this country the view of Lewis that flutter and fibrillation are due to a continuously circulating wave is generally held. An unusual case reported two years ago by H. Cookson and A. E. Clark-Kennedy [2] is considered by Camp and Scherf to support their own hypothesis of the mechanism of flutter and fibrillation. In that case there was an apparent doubling of the auricular wave frequency in a case of flutter, the ventricular rate remaining constant. A variation in the course of the circus wave was believed by Cookson and Clark-Kennedy to be the probable explanation for the appearances, but Camp and Scherf prefer to interpret them as due to a variable block affecting impulses generated in an auricular centre. Their

[1] Wien. Arch. f. Inn. Med., June, 1934, p. 67.
[2] Heart, 1932, xvi., 103.

arguments, while not convincing as to the mechanism of flutter, seem to provide a reasonable explanation for the unusual behaviour of their own case of auricular tachycardia.

GEORGES DREYER

A GREAT tribute was paid to Georges Dreyer, whose sudden death occurred in Denmark last August when, at the Sir William Dunn School of Pathology on Friday last, Dr. Ainley Walker delivered a public address on Dreyer's scientific work at the University. Dr. Walker brought forward the reasons why that work showed both remarkable and original directions and promise of permanent value. Dreyer's earliest important publication from Oxford was an account of his first method of measuring the agglutination titre of blood-serum. This work was published in Denmark under the influence of Madsen, and had escaped general attention in this country. Dreyer, with his assistants, arrived by using standardised materials at the conversion of what had previously been a rough qualitative test into a quantitative measure of the exact amount of agglutinative action present. Later he proceeded in association with Dr. Walker to throw much further light on the source of agglutinins and similar immune products and indeed on the general mechanism of the protective reaction. Dr. Walker outlined this work, pointing out that in its course, and in connexion with other questions that came up for consideration, the researchers became aware that valuable conclusions might follow if they were able to ascertain the total quantity of agglutinin present in the circulating blood of immunised animals, and not merely its percentage concentration. Dreyer undertook a reinvestigation of blood volume in certain smaller animals by very exact methods and the conclusion was arrived at that the volume of the circulating blood, by means of which heat is distributed throughout the body, and is brought to the surface for regulated discharge, must itself be related numerically to the area of that surface. Carefully devised technique was employed for measuring the blood volume of animals—a long series of experiments to this end being carried out by Dreyer and Dr. William Ray. The experiments were communicated to the Royal Society, when Dreyer and Ray were able to show in a series of different species of animals that the blood volume is proportional to the body surface throughout any given species, the constants of their formula being determined for the tame and wild rabbit, the hare, the guinea-pig, the wild rat, and the mouse. Dr. Walker then discussed the controversy which had arisen over the conclusions and detailed the confirmatory work which Dreyer, Ray, and himself had carried out, making mathematical analyses on the observations on blood volume previously published by a number of observers. As a result of these further researches Dr. Walker held that they had been able to maintain the original conclusion, since which time the application of Dreyer's volume formula has offered satisfactory solutions of analogous problems.

Later in his interesting discourse Dr. Walker dwelt on Dreyer's inquiries into how the rapid adaption to diminish oxygen tension, which some successful climbers exhibit during an ascent is brought about, whereas others develop symptoms of mountain sickness. Large sums of money had already been expended in studying this problem in man, but with no convincing results, though many of the observations were made by persons who had themselves just made ascents. It seemed not unlikely that their sense perceptions and judgment were temporarily impaired by that very oxygen-lack whose effects they were trying to observe. The problems were attacked by Dreyer and Dr. Walker who thought that fresh light could be thrown upon them now that a reliable formula for blood volume had been secured. They formed the provisional working hypothesis that the immediate adjustment to gradual lowering of the oxygen tension of the air took place by a concentration of the blood—a lessening of its fluid content—so that more hæmoglobin was present per unit volume, and therefore more oxygen could be taken up in its passage through the lungs than when only the normal amount of hæmoglobin was present. In support of this view were the results of a few inquiries made among men accustomed to climbing or flying, and they were told by climbers that during an ascent they experienced a steady and copious excretion of water by the kidneys, while when occasionally this excretion of water failed to set in, they invariably suffered from mountain sickness. The well-known pharmacological work carried out by Dreyer and himself, with the intention of accounting for the incongruity of results obtained in a number of animals of different size and weight under experimental dosage, was here referred to in proper detail. It had been held that the right dose was arrived at by calculations in proportion to the animal's weight, but the new investigations showed that instead of relation to weight, that is to say to the blood volume of the individual, the relation to the respective body surface of each animal should be regarded.

Dr. Walker then gave details of Dreyer's work during the war and the researches undertaken in Oxford, with the help of the Medical Research Council, to produce in bulk and distribute Dreyer's standard agglutinable cultures and agglutinating sera for diagnostic purposes. He pointed out that this work on serum diagnosis, which gained for Dreyer wide immediate credit, was of the greatest public service at a time of critical need. He considered that Dreyer's researches, centring on the discovery of a reliable formula for the blood volume, though they may not yet have fully penetrated into physiological and pathological teaching, would hereafter come to be regarded as his most enduring contribution to knowledge, and his greatest achievement in biological science.

THE next session of the General Medical Council will open on Tuesday, Nov. 27th, at 2 P.M., when Sir Norman Walker, the President, will take the chair and deliver an address. The Council will sit thereafter from day to day until their business is concluded.

ON Thursday, Nov. 29th, at 9 P.M., Prof. G. R. Minot, of Harvard, one of this year's Nobel prize winners for medicine and physiology, will lecture on Some Aspects of Anæmia at the house of the Royal Society of Medicine. This meeting is open only to Fellows of the Society.

ON Thursday, Dec. 6th, at 5 P.M., Prof. William Wright will deliver the Thomas Vicary lecture of the Royal College of Surgeons of England, his subject being Galen on the Eye. On Thursday, Dec. 13th, at the same hour, Mr. Victor Bonney will deliver the Bradshaw lecture, in which he will speak on the functional derangement of the intestine that follows abdominal operations. Students and others not fellows or members of the College will be admitted on presentation of their visiting cards.

PROGNOSIS

A Series of Signed Articles contributed by invitation

XXVIII.—PROGNOSIS AFTER INJURIES TO TENDONS

INJURIES to tendons can be divided into two categories: (1) subcutaneous or closed injuries to tendons when there is no injury to the skin, and (2) open wounds of tendons. Of subcutaneous ruptures, the only common ones in the upper limb are: (*a*) long head of biceps, (*b*) extensor longus pollicis, (*c*) extensor longus digitorum. Partial rupture of the supraspinatus tendon is rare and a few cases are recorded of rupture of the lower end of the biceps tendon. In the lower limb ruptures occur in (*a*) the rectus femoris, (*b*) the infrapatellar tendon, (*c*) tendo Achillis. The adductor longus and adductor brevis may rupture in riders. Cases are reported of rupture of the hamstrings, but these are usually muscle injuries and not tendon ruptures. Open wounds of tendons occur most frequently on the palmar aspect of the wrist, in the palm of the hand, and on the flexor or extensor surface of the fingers.

Closed or Subcutaneous Injury

Long head of biceps.—When this tendon has been torn from its attachment to the glenoid, operative treatment is usually advised unless there is extensive arthritis of the shoulder-joint or the patient's general condition contra-indicates an operation of this type. After fixation of the long head to the short head or to the humerus in the region of the bicipital groove, the patient will find he has excellent function; there is full movement and a strong arm. Sometimes the belly of the muscle is slightly lower than normal, but this is not associated with any incapacity.

If arthritis of the shoulder-joint is present or for other reasons operation is considered inadvisable the short head of the biceps will take all the strain of the upper attachment, for the long head will coil up just above the belly of the muscle and the belly will be lower than normal. Under these circumstances the function will be limited to some extent, but the total disability is not great because the brachioradialis will materially assist in the action normally fulfilled by the biceps. In old-standing cases of rupture of the long head, function will not be improved by operation.

If operation is carried out for rupture of the *biceps tendon of insertion to the radius*, complete range of movement at the elbow-joint is to be expected with full power of the arm.

Extensor longus pollicis.—Rupture of this tendon occurs in the radial groove, either spontaneously or as a sequel to fracture of the lower end of the radius—in the latter case some weeks after the bony injury. If no operation is carried out the patient will not be able to extend the terminal phalanx of the thumb, as retraction of the proximal portion of the tendon is inevitable. The operation consists in suture of the ruptured tendon directly or by insertion of a tendon graft. Perfect or good restoration of function can be expected in the majority of cases, provided that operation is carried out within a few weeks of the injury, that the thumb is kept fully extended for at least three weeks after the operation, and that the repaired tendon is replaced in the groove so as to preserve the oblique course.

Delayed operation does not produce such satisfactory results and an elongated tendon subsequent to operation is not followed by perfect function. In the cases associated with fracture, good function cannot be expected in the thumb if the fracture was not set satisfactorily.

Extensor longus digitorum.—The insertion of this tendon into the distal phalanx of any finger may be torn away with or without a small chip of bone. The condition is usually treated by placing the finger so that the terminal phalanx is hyperextended with or without flexion of the first interphalangeal joint. Provided that the finger is kept in one of these two positions for four weeks, good function—that is, normal extension and no stiffness of the end of the finger—is to be expected. In a number of cases the last joint cannot be extended fully, but this implies but little disability. Operative treatment at this stage is not followed by any better result. If the case is seen some weeks after the injury the question frequently arises as to whether better extension can be obtained by open operation, that is, by fixing the tendon to the terminal phalanx. On the whole, as useful a finger is obtained by keeping the finger quiet on a splint with the last joint extended as by open operation, even if the splinting is not commenced for three or four weeks after the injury.

The condition is more complicated if the terminal phalanx slips forward at the same time as the tendon is torn. If the reduction of the dislocation under an anæsthetic is perfect, the end-result is as satisfactory as in an uncomplicated case. Imperfect reduction, however, will be followed by painful stiffness of the end of the finger—a serious condition—but one which does not result from the tendon injury alone.

Rectus femoris.—This tendon is torn from the upper lip and anterior surface of the patella, usually in elderly men. Age seldom contra-indicates operation, for the patients are usually of vigorous type. If the tendon is fixed back in position by operation, complete restoration of function is to be expected. If no operation is carried out, weakness of extension of the knee is inevitable, as this will have to be carried out by the lateral expansion of the quadriceps. This is at best not a very efficient method of extension of the knee, and in some cases the rupture of the rectus may extend laterally and so diminish the power of the vasti muscles.

Ligamentum patellæ.—The prognosis after a rupture of this tendon is comparable with that of rectus femoris. If operation is carried out a good result is to be expected, but without operation full extension of the knee will not be possible. Operative treatment for rupture of the ligamentum patellæ some weeks after the injury is not followed by full range of extension. Permanent elongation is almost invariable, even if strips of fascia lata are used to bring the patella nearer to the tubercle of the tibia.

Tendo Achillis.—Recent ruptures of the tendo Achillis are followed by satisfactory results if operative repair is carried out early. If end-to-end suture is not possible, strips of fascia lata are used to reinforce the torn ragged bundles and a strong efficient tendon is produced. Patients find that the leg is weak and plantar flexion uncomfortable often for six months, but after that time active games and driving a car are not interfered with. H. Platt quotes the case of a man whose tendo Achillis he sutured nine weeks

after an injury who subsequently climbed the Matterhorn.

In old neglected cases the leg is weak and there is retraction of the calf. Operative treatment definitely improves the condition, particularly if tendinous or fascial material is used to fill in the gap. Perfect function may be achieved but does not necessarily follow late operative treatment. If operative treatment is contra-indicated it is the custom to follow the treatment John Hunter carried out on himself by keeping the foot in equinus. Although this will approximate the torn fibres, the gap is inevitable in cases of complete rupture. Full dorsiflexion and full power of plantar flexion will not be regained.

Ruptures of the adductors.—This injury does not lead to permanent disability. The fact of ossification occurring in the tendon does not necessarily produce any weakness in the adductor muscles.

Open Wounds of Tendons

Treatment of the complete division of a tendon by splinting alone will be followed by complete loss of the movement normally carried out by the muscle to which that tendon belongs. Contractures may develop. When operative treatment is carried out, better results follow immediate suture, if this is performed under perfect surgical surroundings, than suture which is delayed or performed under faulty operative technique. Taken as a whole, open wounds of the extensor tendons of the fingers do well after suture, whereas wounds of the flexor tendons are followed by limitation of movement and often by stiff fingers.

In order to obtain good results it is essential to study the causes of failure after tendon sutures. The more common causes of failure are: (1) the suture fails and continuity of the tendon is not re-established; (2) anatomical continuity is re-established by suture but function is not obtained owing to adhesions.

Failure of suture may result from suppuration in about 15 per cent. of cases. The mechanical causes of separation of the suture-line depend on the material used for suture, the mobilisation of the tendon, and on muscular retraction. Adhesions of the tendon around the line of suture may be disastrous; these are more likely to occur where the tendon passes through a sheath which cannot distend, such as on the flexor surface of the finger, whereas after suture at the wrist, adhesions may not affect the ultimate efficiency of the suture. Good function is only obtainable if adhesions are avoided by doing a minimum of damage at the time of operation, avoiding infection, and limiting the length of time that the part is immobilised. Failure of tendon suture is likely to be followed by stiffness of a finger and limitation of movement.

The prognosis of open wounds of the flexor and extensor tendons has been considered by Bloch and Bonnet (Jour. de Chir., 1929, xxxiv., 456) and their statistics are of some interest.

Suture of extensor tendons.	Cases.	Results.	
At level of carpus	17 ..	Very good	15
At level of metacarpus ..	110 ..	Good ..	104
Flexor tendons.			
In palm	61 ..	Satisfactory	32
Flexor profundus—			
In finger	44 ..	Bad ..	37
In thumb..	24 ..	Good ..	19

ST. J. D. BUXTON, F.R.C.S.,
Surgeon and Orthopædic Surgeon to King's College Hospital.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

Surg. Comdr. A. J. Tozer to *Pembroke* for R.N.B.

Surg. Lt. F. M. Duthie to *Victory* for R.N.B., and A. K. Stevenson to *Exmouth*.

ROYAL NAVAL VOLUNTEER RESERVE

Proby. Surg. Sub-Lt. J. Scott to be Surg. Lt.

M. D. Edwards entered as Proby. Surg. Sub-Lt. and attached to list 2 of the Ulster Div.

S. E. Cooke and R. P. Phillips entered as Proby. Surg. Sub-Lts.

ROYAL ARMY MEDICAL CORPS

Maj. R. I. Sullivan, M.C., retires on ret. pay.

Short Serv. Commns.—The undermentioned Lts. (on prob.) are secd. under the provisions of Art. 213, Royal Warrant for Pay and Promotion, 1931:—

J. M. Carnow, R. H. Wheeler, J. J. Sullivan, I. U. Young, J. J. C. Rainsbury, J. O'Connell, E. J. Pryn, R. Phillipson, and P. L. E. Wood.

REGULAR ARMY RESERVE OF OFFICERS

The undermentioned having attained the age limit of liability to recall, cease to belong to the Res. of Off.:—

Col. N. J. [C. Rutherford, D.S.O. (late R.A.M.C.), Lt.-Col. M. O. Wilson, and Lt.-Col. A. S. Littlejohns, D.S.O.

TERRITORIAL ARMY

Capt. C. L. Day, R.A.M.C., to be Divl. Adjt., 44th (Home Counties) Div., vice Capt. J. N. Atkinson, R.A.M.C., vacated.

Gerald Green (late Cadet, Queen's Univ. Belfast Contgt., Sen. Div., O.T.C.) to be Lt.

Supernumerary for service with the O.T.C.—Capt. (local Maj.) G. P. Crowden to be Maj.

TERRITORIAL ARMY RESERVE OF OFFICERS

Capt. R. Woodside, from Active List, to be Capt.

ROYAL AIR FORCE

Wing Comdr. H. A. Hewat to R.A.F. Depot, Uxbridge, for duty as Senior Medical Officer and Commanding Officer, R.A.F. Officers' Hospital.

Squadron Leader A. E. Barr-Sim to Central Medical Establishment for duty as Medical Officer.

COLONIAL MEDICAL SERVICE

The following appointments have been made: Dr. J. W. Field becomes Malaria Research Officer I., Institute for Medical Research, Federated Malay States, and Dr. R. T. B. Green, Bacteriologist to the Institute; Dr. F. V. Jacques becomes Deputy State Medical and Health Officer, Perak; Dr. R. W. D. Maxwell, District Medical Officer, Fiji; Dr. G. L. Milburn, Senior Medical Officer, St. Kitts-Nevis; Dr. G. I. Shaw, Medical Officer, Hong Kong; and Dr. A. W. H. Smith, Medical Superintendent, Lunatic Asylum, St. Ann's, Trinidad.

MEDICAL PROBLEMS OF INDUSTRY.—The Ross Institute of Tropical Hygiene is arranging for a two-day conference next July at the London School of Hygiene and Tropical Medicine in order that medical officers in industry on leave from the tropics may meet their colleagues and discuss their problems together. The main subject for discussion will be the prevention of disease—e.g., control of malaria and epidemic diseases in the tropics; water supplies; sewage and refuse disposal; housing; the keeping of records; and hygiene generally. Medical officers practising on plantations, mines, railways, hydro-electric and construction schemes, and other development companies are invited to apply to the organising secretary, Ross Institute, Keppel-street, London, W.C.1. It is intended to make this conference an annual one.

SPECIAL ARTICLES

DIPHTHERIA IMMUNISATION

A REVIEW OF EIGHT YEARS' WORK IN BIRMINGHAM

BY MATTHEW BURN, M.C., M.M., F.R.C.P. Edin., D.P.H., D.T.M. & H.
DEPUTY MEDICAL OFFICER OF HEALTH, BIRMINGHAM; AND
VERA FELLOWES, M.B. Birm.
ASSISTANT MEDICAL OFFICER FOR IMMUNISATION AND MATERNITY AND CHILD WELFARE, BIRMINGHAM

BEFORE the establishment of active immunisation Birmingham had suffered severely from diphtheria for many years, the disease being virulent in type and high in incidence and mortality. The greatest number of cases had always occurred in children between five and seven years of age and a considerable number of pre-school children were undoubtedly infected by older brothers and sisters, while the majority of adults were close relations of the children and followed them to hospital.

Table I. gives the cases and deaths from 1901–33, and Table II. the figures from 1920 to 1933 arranged in age-groups. The notified figures have been corrected after revision of diagnosis. There has been a great increase in the population and in the area of the city since the beginning of the century.

Population	1900	.. ..	519,610
,,	1925	.. ..	925,766
,,	1933	.. ..	1,023,500*

* With approximately 250,000 children under 15 years of age.

TABLE I.—*Diphtheria Cases and Deaths from 1901 to 1933*

Year.	Per 1000 of the population.		Year.	Per 1000 of the population.	
	Case-rate.	Death-rate.		Case-rate.	Death-rate.
1901	1·04	0·16	1918	1·02	0·18
1902	1·44	0·24	1919	1·05	0·14
1903	1·52	0·23	1920	1·93	0·22
1904	1·15	0·21	1921	1·80	0·13
1905	1·23	0·17	1922	1·39	0·10
1906	1·46	0·17	1923	1·65	0·15
1907	1·81	0·20	1924	1·97	0·10
1908	1·49	0·20	1925	2·00	0·10
1909	1·38	0·20	1926	1·88	0·12
1910	1·28	0·13	1927	1·60	0·06
1911	1·35	0·13	1928	1·59	0·07
1912	0·95	0·12	1929	1·64	0·09
1913	1·13	0·19	1930	1·73	0·09
1914	1·84	0·30	1931	1·16	0·06
1915	1·21	0·15	1932	0·61	0·03
1916	1·07	0·13	1933	0·41	0·03
1917	0·86	0·13			

A Résumé of Activities

The first step towards preventive work was taken in 1922 when Dr. E. H. R. Harries, then medical superintendent of the city hospitals for infectious diseases, commenced the differentiation of the nursing staff by means of the Schick test. In 1923 active immunisation of the nursing staff was started, and in 1925 this treatment was extended to the domestic staff. (Details of this work and its effect on the incidence of diphtheria among the staff were published by Dr. Harries in 1930.[1])

In December, 1924, the public health committee considered a scheme prepared by Dr. Harries for the active immunisation of young children at welfare centres, omitting a preliminary Schick test in children under five years of age, a confirmatory Schick test to be carried out about nine months after inoculation.

[1] THE LANCET, 1930, i., 802.

The scheme was not actually put into effect until 1926, although immunisation was carried out in 1925 in three residential institutions, where diphtheria had been prevalent. Early in 1926 Schick testing and active immunisation were offered to relatives and neighbours of children who were in the city hospitals suffering from diphtheria. This was intended as a feeler into the attitude of the public towards the scheme, and was received with such

TABLE II.—*Cases of Diphtheria (C) and Deaths (D) in Age-groups from 1920 to 1933*

Year.	0–5 years.		5–10 years.		10–15 years.		15–20 years.		Over 20 years.	
	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.
1920	389	99	710	79	310	16	131	2	215	5
1921	339	54	633	53	331	11	116	0	233	2
1922	327	33	479	43	232	6	93	1	154	6
1923	402	68	526	42	288	18	125	5	196	6
1924	505	48	623	40	343	11	174	1	242	0
1925	548	54	617	32	366	7	131	0	234	2
1926	464	47	677	52	274	12	141	1	248	4
1927	376	20	561	30	237	7	107	0	262	4
1928	346	26	640	32	257	6	110	1	199	5
1929	402	36	699	34	229	7	116	5	165	4
1930	423	38	660	29	294	6	101	1	223	14
1931	329	22	430	27	179	9	86	1	147	3
1932	179	15	219	15	87	2	47	1	88	2
1933	110	14	145	12	84	3	30	2	48	2

enthusiasm that, while it was realised that at the hospital one was dealing with parents likely to be biased in favour of prevention, there was reason to think that a central clinic would be well attended.

There had been severe outbreaks of diphtheria in two districts during the winter of 1925–26, 11 deaths having occurred among the children attending one small school. These districts were systematically visited by sanitary inspectors and health visitors, explanatory leaflets and appointment cards being left.

In April, 1926, a weekly clinic was opened at the public health department and the clinic at Little Bromwich Hospital thrown open to residents in the neighbourhood. During the first year (April to December, 1926) 426 children attended the central clinic for three inoculations. Between 35 per cent. and 40 per cent. were under five years of age. Testing and immunisation were carried out in three other institutions, and new admissions to the institutions visited in 1925 were tested as soon as possible after admission. Preliminary and confirmatory Schick testing was carried out on all children in institutions, and children attending the central clinic were sent for for confirmatory Schick tests nine months after inoculation. A considerable number failed to attend for this test, and whenever possible the parents were visited and urged to bring their children.

In 1927 over 1000 children attended the clinic for the complete course of injections, but only 55 per cent. attended for the confirmatory Schick test. About 20 per cent. of the children were under five years of age, and 40 per cent. between five and ten years. The number failing to complete the course was 201, and 173 gave primary Schick-negative reactions. Of the negative reactors less than 1 per cent. were between five and ten years of age.

Owing to the great increase in attendance and the large number of Schick-positive reactors, immunisation without preliminary Schick testing was extended to the age of ten years. One session a week proved inadequate, and during most of 1927 three clinics a week were held at the public health department,

two of them in the evening for the convenience of school-children. By the end of the year the scheme was well established, but the number of children immunised was too small to make any impression on the general incidence of diphtheria, and many mothers found the difficulty and expense of bringing several children to the clinic insuperable. It was felt that if treatment could be carried out in schools it would be much simplified and greater numbers of children could be dealt with in a session.

With the coöperation of Dr. G. A. Auden, the chief school medical officer, and the headmaster, the first school was visited in November, 1927, a little Roman Catholic school in an area where diphtheria had been persistently prevalent and severe. At this time the work in the schools was dependent on the goodwill of the head teachers; it meant a great deal of extra work for them at play times and after school hours.

In 1928 two clinics a week were held at the public health department, institutions already visited were kept up to date, and immunisation started in other residential schools. Eight elementary schools—14 departments—were visited, 1387 children were inoculated, and 664 gave primary Schick-negative reactions. It was estimated that by the end of 1928 there were about 8000 persons—mostly children—who had given primary Schick-negative reactions (approximately 2000) or received a full course of injections.

In 1928 the clinic at Little Bromwich Hospital was closed because the district had become more populous and transport easier.

In 1929 special immunisation clinics were held at three of the main welfare centres of the city, in addition to a weekly session at the public health department. Talks were given and demonstrations held at the centres and house-to-house visiting done by the health visitors. A total of 631 children were inoculated at the three centres, a large proportion of these children being of school age. Ten elementary schools were visited, the acceptance-rates varying from 10 per cent. to 80 per cent.

Nearly 4000 children were inoculated in the year, bringing the total of inoculated to approximately 10,000.

Up to the end of 1929 the work had been performed by a general practitioner who had had special training and experience at the fever hospital, assisted when necessary by one of the medical officers from the hospital. She had not time for the increasing amount of immunisation work, and resigned. In March, 1930, one of the writers who had had nearly three years' experience as assistant medical officer at the city hospitals, took up duties as assistant medical officer for immunisation, spending five sessions a week on this work and the remaining sessions on maternity and child welfare work. An important step towards increasing the number of immunised children was now taken in obtaining the permission of the Board of Education to inoculate school-children on school premises during school hours—immunisation being accepted as part of school medical treatment.

In May, 1930, a fatal case of diphtheria occurred at an institution in which Schick testing and inoculation had been carried out since 1926. Investigations were made there and at other institutions, and our findings were published in 1931.[3] Following these investigations, it was decided to abandon the Schick test for these reasons:—

1. We felt that we could not take the responsibility of assuring parents that a Schick-negative reaction indicated a complete and permanent immunity to diphtheria.

2. We were only performing a primary Schick test in children over ten years of age, and the majority of these gave positive reactions, thus adding to the number of visits to schools.

3. It had been found impossible to do confirmatory Schick testing at schools and local welfare centres, and less than half the children attending the central clinic returned for confirmatory Schick tests although a post card was sent making an appointment for every child.

4. The omission of Schick testing would save a great deal of time and enable more children to be immunised in a given time.

The proportion of children immunised up to 1931 was too small to reduce the general rate of diphtheria, and unless numbers were materially increased never would do so. With 216 elementary schools in the city, it would take 18 years to visit each of them once.

During 1930 the work was carried on as before, a total of 4168 children being immunised. Fourteen schools were visited and clinics held at eight welfare centres, since it was more convenient for mothers to take young children to local centres than to make the journey into the city. Arrangements were made to supply toxoid-antitoxin free of charge to medical practitioners who desired to carry out immunisation in their practices.

In April, 1931, Schick testing was abandoned. Seven thousand children were inoculated in the year, 6000 of them in schools, 39 schools being visited for the purpose. It was decided to confine school immunisation to infant and junior departments, the older children being treated at the central clinic or local centres.

In 1932 11,566 children were immunised, 86 schools and 5 centres were visited.

During 1933 a further 12,709 children were completely immunised, 121 schools being visited in the year. A second medical officer gave two sessions a week and a second health visitor five sessions a week to the work for eight months of the year. This was only a temporary arrangement and has been discontinued. By the end of the year all the junior and infant schools and a number of the senior schools had been visited once, and 65 schools had been visited twice. Work was carried out at 14 welfare centres and institutional work kept up to date. All these figures refer to completed cases only.

The Present Scheme

Staff.—One medical officer holds five sessions a week and one health visitor is employed whole-time. Summer holidays are taken during the school holidays, and no immunisation is carried out then except for one session a week at the public health department.

Material used.—Toxin-antitoxin was used in 1925, 1926, and 1927, and toxoid-antitoxin mixture subsequently in 1 c.cm. doses at fortnightly intervals.

Schools.—Each school is visited by the health visitor about a month before the work is to be carried out. She explains the procedure, notes the number of leaflets needed, and fixes a date for the first visit. Leaflets giving the reasons for the work and explaining the simplicity of the procedure, with a space for signature, are distributed to the children, and record cards with a space for the name, age, and address are made out at the schools—the older children writing their own. Three visits are made at fortnightly intervals for the inoculations, and a fourth visit is paid in order that children who have been absent shall have another opportunity of continuing

[3] Med. Officer, July 11th, 1931, p. 15.

the treatment. After the first inoculation the health visitor visits and investigates any complaints. It will now be possible to revisit all the junior and infant schools at intervals of about 18 months.

Welfare centres.—There are 30 welfare centres in Birmingham. Propaganda is carried out at the centres, and when house visiting. Parents are urged to have their children immunised before they go to school. Forms are left for signature and are returned to the centre. When sufficient names have been collected (50 to 150 according to the district), appointment cards are sent and the centre is visited four times for treatment. If a parent fails to attend on either occasion a health visitor goes to ascertain the reason for default and to urge completion of the course, and a post card is sent to each defaulter making an appointment for the fourth visit of the medical officer.

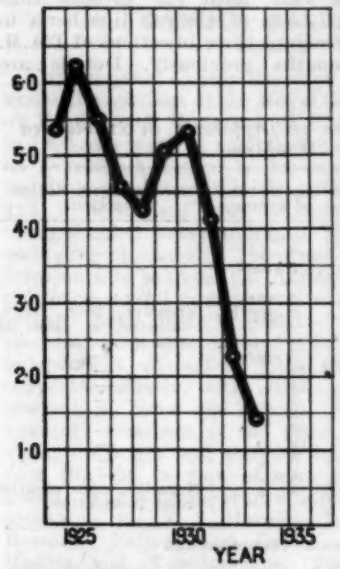


FIG. 1.—Children under 5 years of age. Diphtheria case-rate per 1000 of population.

A special immunisation clinic is held at each centre in turn. The intervals vary with the district. In the large housing estates one or more clinics may be held every year. In districts with fewer children, one in every two years is often enough with the present rate of acceptance.

Central clinic.—One clinic a week is held at the public health department in the centre of the city from 4 P.M. to 5.30 P.M. Children of any age from eight months can be immunised there, but the number of children attending for three doses is now comparatively small—only 139 in 1933—because it is much less trouble for the parents to have the children immunised at school or local welfare centres. The chief value of this clinic is for finishing cases not completed at schools or centres. In every unfinished case a post card is sent making an appointment at the central clinic. Attendances vary from 30 to 100.

Institutions.—Ten institutions are visited regularly and immunisation kept up to date. When only two or three children are admitted at a time they are brought to the central clinic.

General practitioners.—1 c.cm. doses of toxoid-antitoxin (T.A.M.) are supplied free of charge to general practitioners on request, the doses being sent separately at 14 days' intervals. The use made of these facilities by general practitioners is as follows:—

Year.	Children immunised.	Year.	Children immunised.
1930	28	1932	29
1931	61	1933	90

Record-keeping and filing.—All the record-keeping and filing is done by the health visitor. Cards making appointments for welfare centres are sent out by the maternity and child welfare office staff, and T.A.M. for general practitioners by the general office.

Propaganda.—No propaganda is used in the schools, but health visitors and doctors give talks at welfare centres. Since January, 1934, a leaflet has been sent to parents when their child attains eight months of age, giving particulars of the treatment and stating how it may be obtained. Up to date the response has been encouraging, particularly with the more well-to-do parents who are applying to their family doctors. These leaflets are sent out from the general office.

Comments

(1) The problem which concerned one of us on taking administrative control of the work was as follows. It was realised that it was necessary to have some 30,000 to 50,000 protected children before any material reduction in diphtheria could be expected. The approximate school population of the city was 150,000, and some 16,000 children were born annually, yet an insignificant number of children

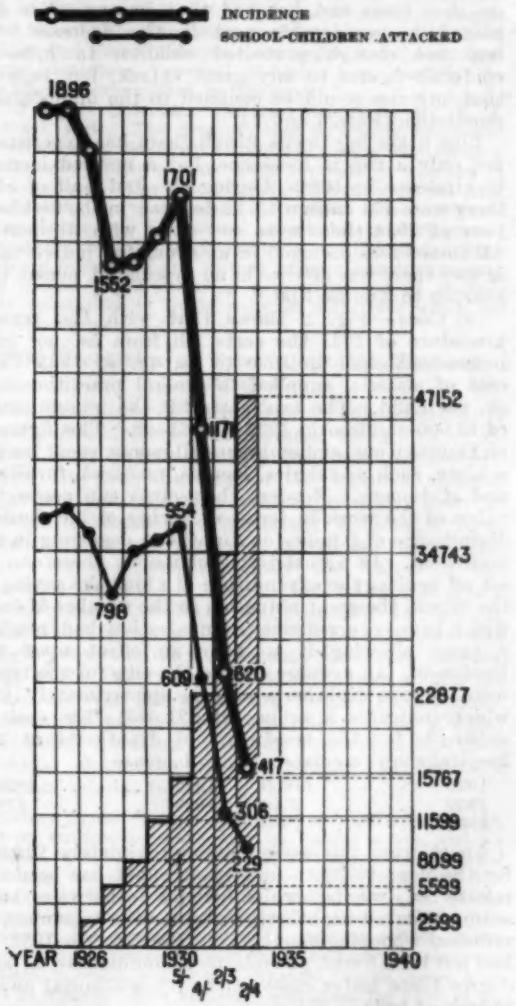


FIG. 2.—Incidence of diphtheria in Birmingham and among Birmingham school-children. The hatched columns, and the figures on the right of the chart, show the numbers of school children immunised. The cost of immunisation per child during the past four years is shown below (shillings and pence).

were being immunised each year. Owing, therefore, to (*a*) the fact that two children who had given primary Schick-negative reactions later died from diphtheria; (*b*) the unfavourable deductions drawn after investigating these cases; and (*c*) the extreme difficulty or impossibility of obtaining 60 per cent. immunity in the population "at risk" with present procedure, the decision was reached that Schick testing, either preliminary or post, should be abandoned, since when the figures for immunisation have increased from 4000 per annum to 11,500, though the actual time devoted to the work and the staff remain the same.

It is estimated that approximately 50,000 persons have been immunised through the public health department from 1925 to the end of 1933. The majority of these are still under 15 years of age.

(2) The average number of cases of diphtheria occurring annually in Birmingham from 1901 to 1930 was 1280. In 1933 the figure was 417, or 863 cases less. While recognising the periodicity of the disease, we did not feel that the phenomenally low records of 1932 and 1933 could be accounted for entirely on that basis and believed that immunisation had played a considerable part in the decrease. We had not enough protected children to influence epidemic figures to any great extent, but believed that any rise would be confined to the uninoculated population (Figs. 1 and 2).

Like other big towns Birmingham has experienced not only a rise in incidence, but a marked increase in virulence in 1934. During the first half of 1933 there were 174 cases with 11 deaths; in the first half-year of 1934 there were 400 cases with 31 deaths. All these cases occurred in uninoculated individuals; in fact there was no case in an inoculated person this year up to August 31st.*

(3) *Costs.*—Fig. 2 shows that with the revised procedure of 1931 the costs fell from 5*s.* per fully immunised child in 1930 to 2*s.* 4*d.* in 1933. The cost of material supplied to general practitioners is 5*s.* per child. The *total* costs for the immunisation of 13,000 children in 1933 was £1562. This figure is an inclusive one, and embraces all money spent on the scheme, such as salaries, locums, material, furniture, and stationery. Readers themselves can assess the value of the work in terms of saving of life, health, disturbance of families on diphtheria occurring in the household. In actual terms of money there can be set off against the expenditure of £1562 the saving to the city in the great reduction in the number of cases which have occurred since immunisation had reached a point allowing it to have an effect upon the incidence. An average cost to the city for the treatment of one diphtheria case is approximately £25, which indicates a saving of £21,575. The cost of antitoxin for the treatment of diphtheria at the hospital shows a corresponding decrease:—

1929	£1659	1932	£623
1930	2046	1933	578
1931	1380		

Apart from this saving of approximately £22,000 for the year 1933, an important effect has been the release of wards, which would otherwise have accommodated diphtheria cases, for the treatment of measles, whooping-cough, &c. Previous to 1931, it had not been found possible to accommodate in any degree these latter cases in the fever hospital owing to lack of beds.

(4) *Diphtheria after inoculation.*—Parents are told that while three injections will usually give a complete and lasting immunity, diphtheria does occur occasionally in an inoculated child, and are warned not to neglect throat ailments. They are also told that the protection takes some months to develop. From 1925 until the present time there have been 14 cases of clinical diphtheria in children who have received three injections of T.A.M. more than six months previously. Details are given in Table III.

TABLE III.—*Cases of Diphtheria in Immunised Children*

Year of attack.	Time elapsed since immun.	Age at time of immun.	Confirmatory Schick reaction.
1925	—	—	—
1926	—	—	—
1927	6 months.	5 years.	—
1928	9 ,,	—	—
1929	1¼ years.	4 years.	—
1930	3½ ,,	9 months.	Negative, Nov., 1929. Positive, at time of attack.
1931	7 months.	5 years.	—
	8 ,,	13 ,,	—
	9 ,,	11 ,,	—
	7 ,,	7 ,,	—
1932	8 ,,	8 ,,	—
	7 ,,	7 ,,	—
	2 years.	10 ,,	—
1933	2½ ,,	8 ,,	—
	1 year.	4 ,,	—
	6 years.	4 ,,	Negative, nine months after inoculation.

immun. = immunisation.

It will be noted that two of these children had given a negative Schick reaction at the confirmatory test. In addition, one boy, who gave a primary Schick-negative reaction in October, 1929, when 12¾ years of age, developed diphtheria in May, 1933. He then gave a markedly positive reaction. With one exception—a fairly severe attack—all these have been mild cases. Occasionally diphtheria occurs within a few weeks of treatment or in children who have not received a full course of injections, but we do not consider these to be failures, since the conditions necessary for protection have not been fulfilled.

(5) *Reactions.*—The number of reactions is extremely small, the rate for 1931 being 1·7 per cent. These showed redness or stiffness at the site of injection, which lasted from 12 to 36 hours, with usually little or no constitutional disturbance. For 1932–33 this reaction-rate had been further reduced to 0·7 per cent.—i.e., in reference to 1932 84 children developed a reaction out of a total of 12,000 children immunised. This reduction is probably due to the fact that the younger children are now predominating.

(6) *Future of the work.*—Now that the main part of the school work is finished the numbers will decrease, since we shall be dealing almost entirely with new admissions and visiting the schools at frequent intervals. To keep up the re-visits, several schools will have to be visited in one session, so that the time spent will be much the same. We are making greater efforts to obtain a higher rate of immunisation among pre-school children, and this work is always slower than the procedure in schools.

We estimate that it will be possible to continue to immunise about 8000 children a year (6000 school children and 2000 pre-school children) if we obtain these acceptances—i.e., approximately half the number of births.

Conclusions

(1) Active immunisation against diphtheria has given excellent results in a large industrial town.

* Since this article was written two further cases of diphtheria have occurred in inoculated children. (1) Inoculated February, 1933 (6 years old); developed severe diphtheria in October, 1934. (2) Inoculated March, 1932 (9 years old); developed mild diphtheria in November, 1934.

(2) The reactions and the occurrence of diphtheria in the inoculated are negligible—e.g., 14 cases of diphtheria have occurred in 58,000 immunised children up to date. (3) The cost, as opposed to that of treating diphtheria, is extremely small.

CANCER RESEARCH

THE Imperial Cancer Research Fund, which works under the auspices of the Royal Colleges of Physicians of London and Surgeons of England, was founded in 1902 as a result of a public appeal. It was designed as a research centre to be entirely independent of hospitals or medical schools, with its own laboratory and a permanent staff of scientific investigators, engaged solely in research into the causes, prevention, and cure of cancer. The Fund receives no grants from outside sources, but during the 32 years of its existence careful administration and generous public support have made it possible to build up capital reserves which have enabled it to maintain its original independent character, while its scientific workers coöperate closely with others engaged in cancer research at home and abroad. Sir Holburt Waring, honorary treasurer of the Fund, recalls these facts about its origin and purpose in his report for the year 1933–34, in view of some confusion which has arisen. The scientific staff number 7 with 2 voluntary assistants, Mr. E. S. Horning, D.Sc., Beit Memorial Research Fellow, and Dr. E. Vásquez-López, of Madrid, and 17 technicians. The total expenditure of £15,064 involved a deficit of £52 over income, the first for 12 years. This is due mainly to the diminution of legacies, donations and subscriptions having risen by nearly £500.

The secretary announces in the annual report that the Fund has joined the Union Internationale Contre le Cancer. The grant of £250 to assist Dr. A. T. Todd, of Bristol, in his investigations on the colloid therapy of cancer has been renewed for a further year.

The Work Accomplished

The director, Dr. J. A. Murray, F.R.S., reports that the preparation of the eleventh Scientific Report and its supplement, now issued,[1] has occupied the scientific staff for a great part of the year. The papers included in it deal with the filtrable tumours of the fowl, the relation of diet to carcinogenesis, the study of the inorganic constituents of normal and malignant cells by micro-incineration, the mode of action of radium and cytological studies of normal and cancer cells in tissue culture. The volume is enriched by 58 beautiful plates, of which 7 are coloured, and by many vivid pictorial charts and diagrams.

The histological and pathological study by Dr. L. Foulds of six filtrable fowl tumours emphasises their distinctive permanent differences from each other, and the identity of their biology with that of the mammalian malignant tumours. A detailed historical summary of the literature of this branch of cancer research by Dr. Foulds is issued as a supplement to the scientific report. It presents in clear perspective what has been done, and should prove of value, both to those contemplating, or already engaged in, work with these neoplasms, and to those interested in the theoretical discussions of their relations to other new growths and the cancer problem as a whole.

The first of two papers by Mr. A. F. Watson, D.Sc., on the influence on tar carcinogenesis of an addition of fresh liver to the diet is reprinted from the *American Journal of Cancer*, and the results of further experiments are given in the second paper. The increased and accelerated carcinogenic response of tar-treated mice when their diet is supplemented continuously with fresh liver is confirmed and new features are brought to light. The factor responsible has not been more closely identified, but a preliminary experiment with desiccated hog stomach (which gave no increase) suggests that it is not identical with the hæmopoietic substance responsible for the therapeutic action of fresh liver in pernicious anæmia.

The two papers on micro-incineration by Dr. Horning describe the distribution of the inorganic constituents in the cells of normal skin and in tar carcinoma, and the changes in a transplantable mammary carcinoma after radium radiation.

Five papers on the action of radium, by Mr. H. G. Crabtree and Dr. W. Cramer occupy nearly half the report; their purport is discussed on another page. Commenting on the application of these observations to the radiotherapy of cancer in man, Dr. Murray points out that none of the methods at present available is specific in its action, and that radiotherapy shares with surgery the further disadvantage of localised effectiveness. We are still far from such knowledge of the nature of the cancerous change and the way in which the altered cell mechanisms produce its manifestations as would indicate the lines of a successful specific treatment. It is undesirable that the improvement of the available methods should await the solution of the more academic questions involved, and the fact that fundamental researches and the study of more immediate practical problems can usefully be combined is exemplified in this report.

The report concludes with two papers by Mr. R. J. Ludford, D.Sc. The first of these is a fully illustrated contribution to the difficult problem of the identification of the cells which migrate from explants of tumours in tissue culture. The appearances of the parenchyma cells, which help to distinguish them from the associated macrophages and fibroblasts, are shown in dark-ground photomicrographs of the living cells, and the confirmatory evidence from fixed and stained preparations is discussed. The second paper describes a new method of staining fatty substances in living cultures with dyes which are insoluble in water.

Characteristics of Transplantable Tumour Strains

The tradition of international collaboration in respect of distribution of material set up by C. O. Jensen early in this century has been maintained. During the year the director has supplied material to 28 workers, and has received material from 10 workers, in laboratories in Holland, Belgium, France, Sweden, Spain, and Hungary, as well as in the British Isles. He mentions especially the value of the cancerous strain of mice bred by Madame Dobrovolskaïa-Zavadskaïa at the Institut du Radium, Paris, which is now well established here and produces a high proportion of spontaneous mammary cancers. Many of the Fund's transplantable tumour strains are in use all over the world and furnish a convenient standard of reference. In order to promote a wider and more intelligent use of these strains, their principal characters are set out in the director's report in tabular form.

Sixteen mouse tumour-strains are included in this Table, four rat strains, one cavy and one rabbit strain, and six filtrable fowl tumours. For the latter are recorded the histology, the percentage of success of grafting, and the duration of life of the bird in weeks. For each of the mammalian strains the information given includes the histology, the average success in grafting (which varies from 30 to 100 per cent.), and the rate of growth, reckoned as time to reach weight of 1 gramme (which varies from 1 to 26 weeks). Information is also given for most of the strains on the percentage of success following reinoculation either with the same strain or with another very sensitive strain—notably, carcinoma No. 63. These percentages are regarded as of fundamental importance if the strains are being used for therapeutic experiments, since these

[1] London: Messrs. Taylor and Frances, 1934, pp. 177, and Supplement, pp. 41, 30*s*.

characters are intimately bound up with the occurrence of spontaneous regression and the behaviour of the tumours to changed environment and other conditions of growth. Some progressively growing tumours set up resistance of varying degree to which they themselves are insensitive, but which can be detected by the reinoculation of tumour-bearing animals with another strain. Attention is drawn to the fact that neglect of the appropriate controls has led to disappointment in the past when therapeutic measures have been transferred to man.

Dr. Murray's plea for the publication of similar tables showing the significant characters of tumour strains maintained by other institutes, for purposes of comparison, will be generally endorsed.

MEDICINE AND THE LAW

Manipulative Surgeons and the Medical Act

LAST week two more cases raised the vexed question of unregistered persons "wilfully and falsely" taking the name or title of physician or surgeon or general practitioner, thereby exposing themselves to a fine under Section 40 of the Medical Act. At Marylebone police-court Mr. James McGuigan was fined £5 under the section. Fortunately no harm had been done to the patients, said the magistrate, but it was "an excessively dangerous thing for a man to hold himself out as a doctor if he is not one." The defendant, stated to have been formerly a boiler-maker in a shipyard, was said to have taken apartments in Gloucester-place and to have described himself as "Dr. McGuigan, manipulative surgeon." A lady living in the same house said she had called him in when she was ill because she thought he was a member of the medical profession. It was stated that, in making some complaint to the police about anonymous messages on the telephone, he had called himself "Dr. McGuigan"; but this he denied. His own evidence was that he had been practising as a manipulative surgeon and masseur for 20 years and had been supported by many registered medical practitioners in London. He told the magistrate that there was no qualification for manipulative surgery; it was just a method of treatment. In the second case last week the Paignton magistrates dismissed summonses under Section 40 against Captain Horace Barrow, described as a bone-setter, who had used the title of "manipulative surgeon" after his name on the gate-post of his house and on his motor-car. When invited by the Medical Defence Union to justify or discontinue the use of these words, he replied that he was not using the title of "surgeon" and would not give up the description on his plate until it was proved that he was not a "manipulative surgeon." The prosecution having proved the use of the words and the fact of non-registration, Mr. Norman Birkett, K.C., for the defendant, objected that it was still not proved that Captain Barrow had used the description wilfully. The magistrates have been asked by the prosecution to state a case for the opinion of a higher court. Judicial guidance will certainly be welcomed. Last year other west-country magistrates (at Plymouth) fined an unregistered person £20 for calling himself an "osteopathic physician and surgeon." Needless to say, the Medical Defence Union was not contending for a monopoly of medical or surgical treatment. Captain Barrow was not summoned for manipulating his patients' limbs, any more than Mr. McGuigan was summoned for using a stethoscope to the patient who gave evidence or for taking her pulse and temperature or for charging her what he called the nominal fee of 7 guineas. Parliament has stated, in the preamble to the statute, the reason why the Medical Act was passed; it was "expedient that persons requiring medical aid should be enabled to distinguish qualified from unqualified practitioners." Parliament has not yet changed the law. The summonses determined by the magistrates last week were directed solely to the enforcement of the Act against the adoption of a description which blurs the distinction made by the Act. It is unnecessary to add that both defendants last week were men of unblemished character and could give the names of distinguished patients. In Captain Barrow's case evidence was also given of his war services and his gratuitous treatment of the poor.

It is evidently wrong to suppose that the unregistered healer, in his choice of description, hugs the borderline so closely out of any set purpose to reap where he has not sown. Osteopath, bone-setter, masseur, or herbalist—the bearers of these descriptions create no confusion under the Act. But the physio-medical practitioners who so very nearly call themselves medical practitioners, and the manipulative surgeons who seem to attach some special status and value to the statute-protected word "surgeon"—they are just the victims of circumstance, unhappy men who cannot help themselves. Mr. McGuigan declared himself anxious to eradicate the impression that he was a doctor; people called him "doctor," but he had done his best to live it down. So too Captain Barrow suggested that he was obliged to use the words "manipulative surgeon" to define and qualify his work. He must add something to the adjective "manipulative"; he did not want to be taken for a card manipulator. The word "surgeon," he said, implied that he manipulated the bones of parts of the body. He did not want to mislead anyone; he did not himself care what he was called; in re-examination he announced himself perfectly willing to use any kind of name that would aptly describe his work. The manipulative surgeons, it is clear, are only too anxious to distinguish their description from the statute-protected descriptions in Section 40. It is just the inherent ambiguity and the limited vocabulary of the English language which makes their chosen descriptions a source of unwanted confusion.

Protest against Jury at Inquest

At an Ilford inquest on Nov. 14th upon the death of a cyclist as the result of a traffic accident, a solicitor, who appeared on behalf of a lorry-driver, protested against the composition of the jury. He complained that they were "patriarchal"; their average age seemed to be nearer 80 than 75 and, in his submission, they were totally unfit to inquire into motor accident cases. He further objected to what he called the undesirable practice of summoning the same jurors time after time. The jury returned a verdict of "accidental death" and exonerated the lorry-driver from blame; perhaps, therefore, the solicitor now feels more respect for the Polonius-like wisdom of the patriarchs of Ilford. The law requires no more of a coroner than that he should summon not less than seven or more than eleven good and lawful men or women. They must not be aliens (unless domiciled for ten years in this country), convicts, or outlaws. Nothing else is prescribed as to their qualifications. For other kinds of juries there is an age limit of 60—or rather persons under 21 and over 60 are not compelled to serve. For a coroner's jury no age limit is specified in either direction. In R. *v.* Divine, *ex parte* Walton, it was definitely laid down four years ago that to have a small panel of "regular jurymen" was an improper practice.

PUBLIC HEALTH

Classification in L.C.C. Institutions

WHEN the Local Government Act of 1929 was passed, it was obvious that the London County Council was faced with a gigantic task in fitting into a new scheme of things all the various establishments belonging to the boards of guardians which had administered the poor-law in the metropolis. In some ways their problem was more straightforward than that of smaller districts, since the aggregation of such establishments in a fairly circumscribed and populous area made classification less difficult than in the average county borough where they were few in number, or in the average county where they were often separated by distances which made specialisation of function administratively inconvenient. London was also fortunate in that 28 of these establishments could properly be called general hospitals (in the sense of the Public Assistance Order, 1930) and their control could be taken from the public assistance committee and handed over at once to the central public health committee. But there were in London, as elsewhere, mixed institutions partly used for the treatment of the sick but not wholly so used to the number of 26. By Section 18 of the Act, since re-enacted in Section 122 of the Poor Law Act, 1930, the London County Council was enabled to delegate poor-law functions to any committee without the reservation of subordinance to the public assistance committee which obtains with regard to purely poor-law functions outside of London. In exercising this power the Council provisionally handed over 12 of the 26 mixed institutions to be administered by the public health committee and 14 by the public assistance committee. Apparently the complexity of the problems arising in connexion with the classification of the sick and other inmates, and with the structural betterment of these institutions, has been such that the Council is now considering concrete proposals. These were presented on Nov. 13th in the form of a joint report by the hospitals and medical services committee and the public assistance committee. Generally the institutions referred to are often of considerable size and they accommodate, in addition to the acute and chronic sick, such other persons as aged, infirm, able-bodied chronic insane, feeble-minded and epileptic, children (healthy and sick) and, in one institution, a few maternity cases. The report proposes that the inmates should now be separated into two groups :—

(1) Inmates or patients to whom the primary approach should be medical (i.e., those who should be seen, examined and supervised by the medical officer without request by the inmate or by the attendant).

(2) Those who are in need of assistance because of destitution and do not fall within the above category.

The former should be under the control of the hospitals committee, the latter of the public assistance committee.

While the descriptions of the types of inmates of mixed institutions mentioned above have been used for many years in poor-law administration, it is a well-known fact that their interpretation has not been uniform. The report recommends that every inmate in the institutions with mixed populations should be individually classified according to the following scheme :—

(*a*) *Able-bodied.*—Persons physically capable of work.

(*b*) *Healthy.*—Healthy persons who, though not considered capable of continuous daily work, are able to look after themselves and to attend dining hall, this class to include healthy aged, healthy deformed, healthy cripples, healthy feeble-minded, expectant and nursing mothers.

(*c*) *Infirm.*—Persons who are normally able to get up and who, although not able to attend dining hall, could use a nearby dayroom, this class to include persons who require a certain amount of assistance from staff in dressing, toilet, or in moving from room to room, and also certain persons who in bad or cold weather may require to spend a few days in bed.

(*d*) *Chronic sick.*—Persons suffering from any specific disease necessitating their confinement wholly or practically wholly to bed, this class to include persons who require daily and continuous treatment from the medical officer and also extremely aged persons who, though suffering from no specific disease, are confined to bed on account of extreme weakness.

(*e*) *Mental cases.*

(*f*) *Maternity cases.*

(*g*) *Children 3 years and over.*—(1) Healthy. (2) Sick.

(*h*) *Infants (i.e., children under 3 years).*—(1) Healthy. (2) Sick.

The institutions affected by this survey are as follows :—

PUBLIC HEALTH ESTABLISHMENTS

Institutions.—City of London, Constance-road, Fulham, Hackney, Hammersmith, Holborn, and Finsbury, St. Mary Abbot's Hospital (institution), St. Alfege's, St. Leonards, St. Pancras, South Grove, Lambeth Hospital (institution portion), St. John's Hospital chronic sick).

PUBLIC ASSISTANCE ESTABLISHMENTS

Institutions.—Bromley House, Poplar, Waterloo House, Islington, St. Marylebone, Chelsea, Westminster, Swaffield-road, Camberwell, Christchurch, Newington, Ladywell, Woolwich.

Homes for the aged poor.—Lambeth Home, Langley House.

According to the scheme of classification, inmates falling into categories A, B, C, G (1), (pending transfer to the education committee) and H (1), (except infants separated from their parents) would be handed over to the public assistance committee, while those in classes D, E, F, G (2), H (1) (infants separated from parents) and H (2) would be under the responsibility of the hospitals committee.

Obviously this desirable rearrangement will entail a considerable reshuffle of the institutional population in London. At present about 4700 public assistance cases are housed in public health institutions and about 1600 public health cases in public assistance institutions. With their redistribution there must be a transference of staff, furniture, and equipment. In order to make it effective South Grove Institution, with 678 beds, will pass from the hospitals committee to the public assistance committee as from Jan. 1st next, new cases will be allocated according to the above classification and transfer of inmates already housed will take place as opportunity occurs. Sick wards will, of course, be retained in public assistance institutions for cases of acute illness of short duration among inmates, but without special nursing staff. Inmates will be allocated to either type of institution with due regard to accessibility to their relatives.

When this process of classification and reorganisation is complete some 2300 beds which have hitherto been used for non-medical cases in public health institutions will it seems, become available for medical purposes. The report indicates, without going into detail, that some of this accommodation will not be very suitable for its new purpose without some remodelling. In fact, it seems likely that the scheme can hardly be fulfilled in its entirety without structural work of some magnitude.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED NOV. 10TH, 1934

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 0; scarlet fever, 3628; diphtheria, 1574; enteric fever, 21; acute pneumonia (primary or influenzal), 701; puerperal fever, 46; puerperal pyrexia, 108; cerebro-spinal fever, 10; acute poliomyelitis, 19; encephalitis lethargica, 4; continued fever, 1 (St. Albans); dysentery, 16; ophthalmia neonatorum, 70. No case of cholera, plague or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on Nov. 19th–20th was as follows: Small-pox, 0; scarlet fever, 1976; diphtheria, 2049; measles, 188; whooping-cough, 165; puerperal fever, 18 mothers (plus 7 babies); encephalitis lethargica, 265; poliomyelitis, 10; "other diseases," 272. At St. Margaret's Hospital there were 16 babies (plus 8 mothers) with ophthalmia neonatorum.

Deaths.—In 121 great towns, including London, there was no death from small-pox, 1 (0) from enteric fever, 8 (1) from measles, 3 (0) from scarlet fever, 5 (0) from whooping-cough, 41 (9) from diphtheria, 38 (13) from diarrhœa and enteritis under 2 years, and 46 (14) from influenza. The figures in parentheses are those for London itself.

Birmingham reported the only death from enteric fever. Diphtheria proved fatal in 6 cases at Liverpool, 5 at Birmingham, 2 each at Leeds, Manchester, Newcastle-on-Tyne, Wakefield, and Warrington. Liverpool reported 5 deaths from diarrhœa, Birmingham 4. Deaths from influenza were widely scattered, no great town reporting more than 2.

The number of stillbirths notified during the week was 262 (corresponding to a rate of 43 per 1000 total births), including 42 in London.

PANEL AND CONTRACT PRACTICE

Certificates and Certificates

FAMILIARITY breeds contempt. This adage is very true of the troubles of the insurance practitioner with his certificates. He is so frequently signing and dating National Health Insurance form "Med. 40" that he is apt to forget the exact wording of the certificate to which he is putting his signature. The part of the wording which is apt to be forgotten is "*I hereby certify that I have examined you on the under-mentioned date and . . .*" and to overlook it is to risk the censure of the General Medical Council—a much more serious affair than the censure of the medical service subcommittee which is the common penalty for breaking this certification rule, often in a sincere desire on the doctor's part to help his patient. Take, for example, a case sent into hospital for some seriously incapacitating disease. A relative comes to the surgery with the statement: "The agent says you must give me a certificate otherwise I shall not get any money." Thinking to help in a deserving case, with the authority of the agent behind him, he may be tempted to certify that he has examined the patient on a date when in fact he has not done so and the patient was miles away in hospital. The inference is that the agent never said anything of the sort. He probably said he must have the doctor's certificate before he could pay, and the relative jumped to the conclusion that the insurance practitioner must be the doctor referred to, whereas the hospital doctor was intended. It is never safe to give such a certificate, for even if the bona-fides of everyone concerned is beyond cavil, an accident may have occurred causing death between the time the patient was known to be alive in hospital and the date of giving the certificate. When an insured person goes to hospital all that is required is a certificate from some responsible officer (not necessarily a doctor) that the patient was admitted on such-and-such a date. Later, a certificate will be required saying he was discharged on a certain date, but none in between. When the insured person is an out-patient at a hospital his insurance doctor is required to certify his incapacity weekly according to the rules if, and only if, he has sent the patient to the hospital. If an insured person goes to a hospital on his own account for treatment, the doctor attending him at the hospital should furnish the certificate of incapacity and the patient's insurance practitioner should refuse to do so. The recent panel conference agreed with the Insurance Acts Committee and the approved societies that in the interest of all concerned practitioners should fill up that part of form "Med. 40" which says: "you should come to see me again on.....day next." At present this is hardly ever done. This, it is hoped, will save the days of delay of going to the doctor for a final certificate, but there will then arise the question of patients demanding certificates on particular days of the week. This has always been resisted by the profession, with the support of the Ministry of Health.

THEIR INFINITE VARIETY

Let us suppose that in a fairly large insurance practice there are 30 insured persons requiring weekly certificates—not a very large number in a week when spread over six days. But if they all come up on a Monday morning for a certificate and for a repeat of medicine (whilst they were there) probably the shortest time in which they could each enter the consulting room, have their medical record card found, ask for a continuation certificate together with medicine if required, and go out again, would be three minutes. This would of course be increased if any physical examination or dressings were required. Thirty patients at three minutes each makes an hour and a-half of surgery time occupied simply in giving certificates. Obviously it is impossible to allow all insured persons to come up to any particular consultation time for certification. So much for insurance certificates such as first, intermediate or final. But that does not by any means complete the list. There are intermediate convalescent and special intermediate certificates, certificates of death, voluntary certificates, certificates when the diagnosis is not recorded as precisely as the doctor knows it, certificates for tuberculosis officers, reports for regional medical officers, certificates under clause 7 (ii) of the terms of service, ophthalmic certificates, dental certificates, and the list is then not complete. This array of certificates is often a source of amusement to students in medical schools when lectures are being given on National Health Insurance regulations. They are inclined to wonder why one form cannot be used for everything. Add thereto that these insured persons are also able to claim certificates that are commonly required for any adult, whether insured or not, then the number that may be required is indefinitely increased.

OUTSIDE THE ACT

The Lanarkshire Medical Practitioners' Union have drawn the attention of the Committee on Scottish Services to the time factor in the filling up of the multitude of certificates required of them at the present time. There has been, they say, a great increase in the calls made upon the profession for the issue of all sorts of certificates. The demand made by public health and other authorities for certificates from medical practitioners has expanded beyond reason and

seriously limits the time available for clinical treatment. The certificates are required to protect all kinds of schemes and funds, the doctor often being used simply as a buffer, or exploited because he is prepared to assist his patient in matters outside the routine of his profession, e.g., in certifying the application for a passport. He cannot well refuse an old-age pensioner, unable to go to the post office to get his pension, who therefore requires at regular intervals evidence of incapacity, or that he is still alive. Certificates are often required for children who have to be seen but are away at school when the visit is made. As the Lanarkshire doctors say, "this is the type of certificate which legislation and regulation are constantly adding to the burden of the general practitioner." Their feeling is that they should not be required to grant certificates if other evidence be available. They have compiled for their own use a list of certificates other than those required under the N.H.I. Acts, with suggested minimum charges. The list is not exhaustive. The passport certificate for instance is not included; nor is, to go further afield, the certificate that the blood of the mother of an illegitimate child, which is to be adopted, gives a negative Wassermann reaction. The list is interesting in showing the charges made in Scotland for certificates when charges can be made.

LANARKSHIRE MEDICAL PRACTITIONERS' UNION
MINIMUM CHARGES FOR CERTIFICATES

1. Works Societies—No charge.
2. Works for Compensation—If under Scheme no charge—otherwise 1*s.*
3. Certificate for Friendly Society (Fitness for Membership, 2*s.* 6*d.*, or Sickness, 1*s.*).
4. Fitness for Work after period of sickness when unemployed—Not necessary.
5. Fitness for Convalescent Home—No charge.
6. Accident Claims against Insurance Companies and Newspapers—Minimum 5*s.*; 21*s.* if report.
7. School Teachers for Education Committee—Minimum, 2*s.* 6*d.*
8. Certificate of Sickness for Employer—1*s.*
9. Health Certificate for young person entering Bank, &c.—Report, 21*s.*
10. Certificate on Soul and Conscience for juror or witness unable to attend Court—10*s.* 6*d.*
11. Certificate for girl entering physical culture training, nursing, massage, training, &c.—5*s.*
12. Certificate to child as free from infection—Consultation fee.
13. Police Constables Certificate for superiors—Covered by visiting Fee.
14. Court Certificate to substantiate claim—21*s.*
15. School (absence) Certificate—Refuse unless parents summoned to Court.
16. Certificate to Labour Exchange recommending change of employment—Refuse.
17. Factory Medical Certificate for scheduled industrial disease. } Fees fixed by Statute
18. Lunacy Certificate. } Fees fixed by Statute
19. Certificate of Mental Deficiency in children. } Fees fixed by Statute
19a. Colliery Firemen's Certificate under Mines Act. } Fees fixed by Statute
20. Welfare Nourishment Lines—Refuse.
21. Certificate to person unable to go to Post Office for Pension—No charge.
22. Certificate for Employer who insures against loss of Workers' services—5*s.*
23. Certificate under the United Services Fund—No charge.
24. Certificate of Fitness or Unfitness for Work—Covered by No. 4.
25. Blue Form for Pension—No charge.
26. Motor Driver's Licence—Minimum, 5*s.*
27. Ministry of Transport *re* Conductors—Minimum, 5*s.*
28. Preliminary Examination of Police Recruits—Minimum, 5*s.*

ROYAL COLLEGE OF SURGEONS OF ENGLAND

ANNUAL MEETING OF FELLOWS AND MEMBERS

Sir Holburt Waring presided at the annual meeting of Fellows and Members held at the College on Nov. 15th and moved the adoption of the annual report and accounts. He outlined the arrangements for holding the primary F.R.C.S. examination in Australia, New Zealand, and India at the end of the year and said that the number of overseas candidates for the Fellowship is steadily increasing. He explained the new regulations which the College has made for admission to the final examination and which come into force at the beginning of next year. A candidate for the final Fellowship must have passed the primary examination and be either a member of the College, who has studied medicine not less than six years or a graduate of four years' standing in a recognised university who has held a resident hospital appointment for not less than six months in charge of general surgical patients. Members of the College would thus have three or four years' advantage over non-members.

Replying to a motion to allow members of ten years' standing to take the final Examination without sitting for the primary, Sir Holburt declared that such a concession would lead to uncertainty in the standard and to justifiable discontent among those who could not obtain it. He read the statement of the College's views on patent medicines legislation which has been sent to the Committee on Scientific Research of the Economic Advisory Council; this expresses the opinion that the problem can only be adequately dealt with on the lines laid down by the select committee of 1914 by bringing the sale of proprietary medicines and appliances under the control of the Ministry of Health. Such a control, the College considered, should ensure that the article in question is not injurious; that the description of its therapeutic action is not fraudulent; that its sale and the methods of its advertisement are not against the public interest; and that no medicine or appliance is advertised as a cure for any of a specified list of intractable diseases.

Sir Holburt announced that the College, together with the Royal College of Physicians, had submitted to the Privy Council a memorandum approving of the suggestion that a charter should be granted to the Incorporated Society of Chiropodists, provided that the scope of the work is suitably limited to ensure that any operation on deformities or on structures below the true skin, or the use of anæsthetics, shall be carried out under medical supervision.

Mr. F. McG. Loughnane, F.R.C.S., moved—

"That this forty-fifth annual meeting of Fellows and Members of the Royal College of Surgeons of England reaffirms that the Members, who constitute ninety per cent. of the College, should have some representation on the Council, a similar resolution having been passed forty-four times and never once lost."

The resolution was seconded by Mr. Percy B. Spurgin, M.R.C.S., and carried with a single dissentient.

NEW MATERNITY BLOCK FOR LEAMINGTON HOSPITAL. It has been decided to erect another maternity block to accommodate 20 patients. It will cost £20,000.

CHRISTMAS COMFORTS FOR PENSIONER PATIENTS.—The Order of St. John and the British Red Cross Society have arranged, through the Ministry of Pensions, as in previous years, to provide additional comforts for men in Ministry hospitals on Christmas Day. There are ex-service pensioners in other hospitals as a result of war disabilities and the Joint Council wishes to hear of them so that no eligible case may fail to receive the gifts. The address of the Joint Council is 12, Grosvenor-crescent, London, S.W.1.

A NEW GREAT ORMOND-STREET HOSPITAL

AN appeal is made this week for £400,000 with which to reconstruct the Hospital for Sick Children—justly described by the Prince of Wales, its president, as the most famous children's hospital in the Empire. For over 80 years, the Prince points out, it has been fulfilling its mission. "Just because it was the first in the field it has, of late years, fallen far behind modern standards of efficiency, not in treatment but in accommodation and equipment, and now nothing short of a complete reconstruction of its old-fashioned buildings will enable it to maintain its great ideals and traditions."

The accompanying illustration—from the photograph of a model—shows the projected new buildings. The area they cover stretches from Great Ormond-street (on the left) to Guilford-street (on the right). The present ward blocks lie along the Great Ormond-street frontage, to the south of the area, and are sheltered from sunshine by surrounding buildings. Under the new plan the wards will be set back 250 ft.; and the single-storeyed out-patient departments erected in their place will do nothing to keep the light from them. The two L-shaped blocks, joined by a central section, will readily be identified in the photograph: the nearer, the medical ward block, is to have 164 beds (25 for tonsils and adenoids), while the further, or western, is the surgical wing with its 130 beds; between them the central section provides kitchens, laboratories, a double theatre suite, and accommodation for paying patients in 35 one- or two-bed units. To minimise the risk of infection no ward will have more than eight beds, and all will have ample balconies on at least two sunny sides. Even in mid-winter the sunshine will penetrate to all ward windows.

Architects: Stanley Hall and Easton and Robertson.
The Hospital for Sick Children as it is to be. The Great Ormond-street or south frontage is on the left and the Guilford-street frontage on the right.

At the top right-hand corner of the picture, built along the south side of Guilford-street, is the new nurses' home, already complete, in which every sister and nurse has a separate bedroom. The rest of the Guilford-street frontage will be occupied by a building, continuous with the nurses' home, embodying the boiler house and quarters for the rest of the staff. The administration will remain in remodelled building in Powis-place, centred around the chapel, which remains unchanged and is to be seen in the photograph on the west side of the new central garden.

All this cannot be done suddenly, for the business of the hospital has to go on as usual during alterations. The plan of campaign is outlined by the architect, Mr. E. Stanley Hall, F.R.I.B.A., in one of several articles appearing in a four-page advertisement supplement to last Tuesday's *Times*, where many further illustrations and particulars may be found. The new nurses' home, as we have said, is already in being, and small additions to the out-patient department are also finished. The next building to be erected will either be the medical ward block (which will cost nearly £80,000) or the central section with its kitchens, laboratories and pay-beds (£55,000). Both are urgently needed. Then, in turn, come the completion of the staff house (including the boiler house), and of the surgical unit (£75,000). When these are ready the patients can be moved out of the old buildings, and in due course these will make way for the out-patient departments.

The new design makes brilliant use of the old site; and with its country branch at Tadworth-court (whose first open-air pavilion was described in THE LANCET of June 4th, 1932) the hospital will again have accommodation and opportunities worthy of its great name. We trust that there will be a very prompt and generous response to the appeal.

The Princess Royal has announced her intention of attending a meeting at the Mansion House on Tuesday, Dec. 11th, when the Archbishop of Canterbury will recommend it to the public.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION.—Dr. A. E. Clark Kennedy will speak at the Medical Society of London, Chandos-street, on Tuesday, Nov. 27th, at 2.30 P.M., on Goitre, and at 2.30 P.M. on Dec. 4th on Glycosuria. On Nov. 28th, at 8.30 P.M., Dr. C. E. Lakin will lecture on diet in deficiency diseases. The following courses will take place during the last six weeks of the year: infants' diseases at the Infants Hospital Vincent-square, S.W. (Nov. 26th to Dec. 8th); dermatology at the Blackfriars Skin Hospital (Nov. 26th to Dec. 8th); chest diseases, at the Brompton Hospital (Dec. 12th to Jan. 11th). Further particulars may be had from the secretary of the fellowship, 1, Wimpole-st, W.1.

CORRESPONDENCE

ELECTION OF DIRECT REPRESENTATIVES TO THE G.M.C.

To the Editor of THE LANCET

SIR,—May I have the courtesy of your columns to express my thanks to the registered medical practitioners of Scotland for the renewal of their confidence in their Direct Representative on the General Medical Council. I am, Sir, yours faithfully,

Edinburgh, Nov. 15th. NORMAN WALKER

LONDON UNIVERSITY AND ITS MEDICAL SCHOOLS

To the Editor of THE LANCET

SIR,—As a member of the court and of the senate of the University of London I have been impressed by the very small proportion of students studying at London medical schools for a London degree who actually complete their course and proceed to a degree. That this ratio is indeed glaringly small will be evident when I mention that in one recent instance a medical school reported in a certain year 33 students as following courses for the London medical degree, but only one actually graduated. When we consider the very large sum—over £100,000 for the current year—which the court of the University distributes as grants to the medical schools of London such a result cannot fail to be disappointing. It has been explained in various ways at interviews which the court has held with the medical schools; the principal reason given has been that owing to economic stress students have been obliged to enter practice with lower qualifications than the degree, and have been unable to wait to take the degree itself. They have thus wasted as regards any university recognition several years of education of the highest university standard, and their position is all the more galling as London University students at the medical schools meet with large numbers of students who come for their clinical training from the older universities to the medical schools, and these students come to London with a degree (usually B.A.) from their university as a result of three years' study in medical sciences, whereas the London University student, after three years' equivalent study, achieves only the second M.B. examination, which is of an intermediate and not a degree status, although the subjects and the level of attainment in them are entirely comparable with those which qualify for a B.A. degree at the older universities. Statistics supplied by the schools demonstrate that the majority of students entering for the London degree pass the second M.B. but are unable to stay the course for the third examination. The London University student is thus obviously handicapped as compared with his fellow-student from the older universities. This is a grievance of old standing, and I submit that the time has come to rectify it, in the interests both of the students themselves and of the University, which is deprived of large numbers of students who by the standards of the older universities would have taken a degree. This would be an advantage to the student even though he failed subsequently to achieve the qualifying examination for M.B., B.S., and the reform would incidentally remove the reproach that the London medical schools produce very few actual graduates of London University.

The remedy I propose is that the senate should institute a new degree in the faculty of medicine which might have the name of Bachelor of Medical Sciences, attainable after a three years' course of study. This name is suggested to me by my recollection of the effort made some 30 years ago to found an "Institute of Medical Sciences," which would have covered all the subjects leading to the second M.B. examination, but the name adopted is a secondary consideration so long as it involves a degree. This degree would be a degree in the faculty of medicine as the Bachelor of Pharmacy now is. It would take the place of the present second M.B. examination and would of course not be a registrable qualification to practise medicine. To give this degree a standing comparable with the other degrees of the University the standards of the first and second M.B. examination would where necessary have to be raised to the level of the intermediate and final examinations in other faculties. Such an adjustment would not be difficult and the stiffening of the earlier examinations would not in the long run hurt the student, who would find out his weakness before wasting time upon a hopeless task.

I submit this proposition for consideration by the teachers in medical schools of the University who are primarily interested in the matter, and this letter is written in the hope of eliciting their views.

I am, Sir, yours faithfully,

E. GRAHAM-LITTLE.

House of Commons, Nov. 16th.

CHEMICALLY BLEACHED FLOUR

To the Editor of THE LANCET

SIR,—Dr. Oliver's letter in your last issue is very opportune. I was a member of the Departmental Committee on the Treatment of Flour with Chemical Substances which was appointed by the Minister of Health in 1924 to inquire into the subject, and which issued its report in February of 1927. The members of that committee saw the actual bleaching processes in operation at a number of mills, and took a considerable amount of evidence. The salient points of their report so far as bleaching is concerned were:—

(1) Bleaching of flour was introduced into this country about 1905 to enable the millers to compete with the natural bleached commodity offered by flour importers, and so to supply the white flour for which a large demand had arisen. The departmental committee was informed that a number of millers who formerly declined to bleach their flour found themselves obliged to adopt the practice in order to compete with their rivals, but that some of them would not regret having to abandon bleaching if its use were universally prohibited.

(2) That bleaching eliminates the difference in appearance between the higher and lower grades of flour, so that the lower grade flours can be given the brightness and colour of top grades.

(3) So long as a great demand exists in this country for very white breads, some form of bleaching process must be permitted.

(4) Chlorine is capable of altering the composition of gluten in such a way as to affect injuriously its nutritive value, and in view of that and similar considerations the treatment of such an important foodstuff as flour with chlorine or nitrogen trichloride is undesirable.

(5) Benzoyl peroxide owes its bleaching properties to its power of oxidising the colouring matter of the flour. It leaves as a residue in the flour benzoic acid, and it were better that flour should not contain any benzoic acid.

(6) Nitrogen peroxide produces in flour definite changes which cannot be regarded as entirely free from objection, but from the fact that nitrogen peroxide is less reactive than chlorine with proteins and fats, and that excessive

quantities are not required, it is perhaps permissible to regard its addition to flour less unfavourably than the use of chlorine.

In my opinion the principal objection to the bleaching of flour by chemical agents is that it necessitates the removal of the germ and a considerable proportion of the pericarp and aleurone layers of the wheat grain, and as it is in these portions of the wheat grain that vitamin B, the most important vitamin in flour, resides, it follows that bleached flour is deficient to a great extent in that vitamin. It was given in evidence before the departmental committee that there is no agent except sulphur dioxide (which is for many reasons unusable) which will bleach bran and fibre, and therefore for the effective bleaching of flour the germ and the greater part of the branny particles must be removed beforehand. In addition we do not know what effect these powerful bleaching agents may exercise on vitamins; it is possible that they may so alter them as to impair irremedially the nutritive value of the food which contains them. In the United States of America the bleaching of flour has to be declared, and in Pennsylvania, North Dakota, and Wisconsin the sale of bleached flour is prohibited.

It is very desirable that a campaign should be started in this country to disabuse the public mind as to the imaginary superiority of very white bread, and to impress upon the public the greater advantages, both from the dietetic and health points of view, of bread prepared from unbleached and untreated flour. Such a campaign, to carry any prospect of success, should be conducted by some responsible public body.

I am, Sir, yours faithfully,

ARTHUR P. LUFF.

Limpsfield, Surrey, Nov. 17th.

THE SWAB IN DIPHTHERIA DIAGNOSIS

To the Editor of THE LANCET

SIR,—Many practitioners have commented recently on the not infrequent negative report from the bacteriologist in cases of clinically typical diphtheria. The following experience which I had last summer has confirmed an impression I have had for some time past with regard to the unsuitability of some ordinary bacteriological methods when *gravis* bacilli are concerned, and may serve to explain some of the discrepancies between bacteriological and clinical findings which have recently been reported.

I was asked to investigate a small outbreak of diphtheria in a residential school. Swabs were obtained from the patients and a number of contacts, and were inoculated on to Loeffler slopes, from which subinoculations were made 24 hours later on to Horgan and Marshall's blood tellurite plates. Smears, stained by Albert's and Neisser's methods, from overnight cultures on Loeffler's medium revealed very few typical *C. diphtheriæ*, even from the most typical cases, although organisms which appeared to be barred diphtheroids or elongated *C. hofmanni* were numerous. On the other hand, from all the cases and many of the contacts, the subcultures on Horgan and Marshall's medium [1] yielded black colonies, with the subjacent whitening given by *C. diphtheriæ* which is noticeable when digest glucose broth is used as the basis of the medium (O'Meara and Parish [2]); *in every instance the organisms were of the gravis type described by the Leeds workers, and proved to be virulent to guinea-pigs.*

This confirmed our previous impression that Loeffler swab cultures are unsatisfactory for the recognition of certain strains of *C. diphtheriæ gravis*, since the morphology is often aberrant; polar-staining may be absent, and the organism may assume the appearance of a barred diphtheroid or a somewhat elongated Hofmann's bacillus. After several generations on Loeffler's serum the usual morphology of the diphtheria bacillus, with typical polar-staining, may be acquired. Anderson, Happold, McLeod, and Thomson [3] have also made the same observation that "on Loeffler, granules of *C. diphtheriæ gravis* are sometimes well marked but may be scanty."

I feel that some of the discrepancies between clinical and bacteriological findings to which attention has recently been drawn may be due to the use of Loeffler's serum. There is strong evidence that the *gravis* type of bacillus is appearing in new areas in England. It is possible that bacteriologists, by following what has hitherto been generally regarded as a safe routine method of culture on Loeffler slopes, and staining for polar granules, are at times being led into error, and are missing *gravis* bacilli in routine diagnosis. It is therefore suggested that bacteriologists (and they are many) who are at present relying solely on Loeffler's medium should use a tellurite medium—e.g., McLeod's or Horgan and Marshall's—in conjunction with it as a routine. An additional argument in support of this recommendation is that Loeffler's medium is not easily prepared well by the worker in a small laboratory. Horgan and Marshall's medium, on the other hand, is very easy to make.

McLeod's tellurite medium is extremely useful for rapid differentiation of *gravis*, *mitis*, and *intermediate* types; often the colonies observed after only 24 hours incubation are quite typical. Although this is an excellent medium, and may be used for primary cultivation and isolation as a substitute for Loeffler's serum, it is, unfortunately, somewhat difficult to prepare. We are under the impression that it is not always being made precisely as in the Leeds laboratory, so that in practice it does not give as rapid and excellent differentiation as has been obtained there. Horgan and Marshall's medium, modified by the addition of 0·5 per cent. glucose to the digest broth basis, can be recommended with confidence. It is as easy to prepare as ordinary blood agar.

On this medium typical small black colonies appear usually after over-night incubation, and when these are picked up on a platinum loop the subjacent medium shows whitening, if the organisms ferment glucose—an easy method of differentiation of *C. diphtheriæ* and *C. xerosis* from *C. hofmanni*. With very rare exceptions all other organisms are inhibited, so that a much heavier inoculum can be used than for isolation on Loeffler's serum. In our own work we have for two years used as a routine Loeffler slopes, the over-night growths from which are heavily subcultured on to Horgan and Marshall's plates, irrespective of whether they are microscopically positive or negative. In many instances we have successfully isolated on the tellurite medium virulent organisms which would otherwise have been missed.

Although Horgan and Marshall's medium is so useful for isolation, the diphtheria organisms grown upon it appear shorter than on Loeffler's serum, and the polar-staining of all the Leeds types—*gravis*, *mitis*, and *intermediate*—is suppressed. Moreover, the *gravis* and *mitis* strains do not give rise to two distinctive types of colony as on McLeod's medium, a drawback which can be overcome by the subsequent inoculation of starch tubes which will readily enable the bacteriologist to make a diagnosis of type.

A further point of some importance is that Albert's method [4] appears to be more useful for staining polar bodies than Neisser's method which is still widely used.

In conclusion, if the relatively simple combined Loeffler-Horgan and Marshall technique is adopted, it is suggested that the bacteriologist should submit (*a*) an early provisional report as a result of his

[1] Jour. of Hyg., 1932, xxxii., 544.
[2] Jour. Path. and Bact., 1933, xxxvii., 165.
[3] Jour. Path. and Bact., 1931, xxxiv., 667.
[4] See Mackie, T. J., and McCartney, J. E.: Practical Bacteriology, 4th edition, Edinburgh, 1934, p. 161.

examination of direct smear (to exclude Vincent's angina) and Loeffler's swab culture, followed by (*b*) a final report when he has completed his examination of Horgan and Marshall plates, and, where necessary, performed tests for virulence. The clinician for his part should realise that an early negative report *may* be unreliable and subject to revision. The position is admittedly unsatisfactory, since the value of the swab would now appear to be often administrative rather than clinical. As has often been emphasised before, the only safe course open to the practitioner is to rely solely on his own judgment and administer antitoxin without delay, whenever this is indicated on purely clinical grounds.

I am, Sir, yours faithfully,

H. J. PARISH.

Wellcome Physiological Research Laboratories, Beckenham, Nov. 10th.

CLINICAL SIGNS OR MECHANICAL MEASURES?

To the Editor of THE LANCET

SIR,—In these days when mechanical examinations are so much in vogue, clinical observations are often overlooked and methods of value, involving only eyes, ears, and hands, are unknown or disregarded. Owing to the rapidity with which rubber perished in the tropics where I worked for many years, I was driven to find an alternative to the mechanical blood pressure apparatus. I happened to observe that I could estimate the blood pressure with considerable accuracy by tracking the aortic sounds from the second right costal carrilage upwards and outwards to the angle below the clavicle under the deltoid origin.

I have found the method especially valuable in judging normal blood pressure, thereby saving time in the examination of patients. But no more can I do this, because recently a patient and another doctor have, as it were, censured me for not "taking the blood pressure" with bag, bellows, and Baumanometer, in order to find it normal. I have long treasured my simple clinical discovery, but, though it provides me with an accurate idea of circulatory tension, I must put it away and rely only on mechanical methods so that patients, and doctors, may rest assured that the normal has been discovered in the only way of which they have heard.

I am, Sir, yours faithfully,

London, Nov. 15th V. S. HODSON.

ACRIFLAVINE FOR SCHISTOSOMIASIS AND ANKYLOSTOMIASIS

To the Editor of THE LANCET

SIR,—In your issue of April 28th Fisher stated that in his experience schistosomiasis can be successfully treated by oral administration of acriflavine. On July 21st Fakhry reported that trypaflavine (acriflavine) has no effect on schistosomiasis, but is a useful anthelmintic in ankylostomiasis. On Sept. 8th Diwany claimed that acriflavine differs from trypaflavine, and said he had obtained good results with it in the treatment of schistosomiasis.

Trypaflavine is regarded by many authorities as the same compound as acriflavine. The first originated as a German patent and the latter as a British patent. Chemical analysis of several samples of these drugs was carried out in the Research Institute, Cairo, by Dr. A. Hassan with the following results:—

(i)—Trypaflavine (Bayer sample No. 2852) described as chloride of 3:6:diamino-10-methyl acridine, did not give a precipitate with silver nitrate. The chlorine inorganic combination was estimated to be 13·48 per cent. The amount of chlorine calculated for the compound $C_{14}H_{14}N_3Cl$ is 13·68 per cent.

(ii)—2:8:diamino-10-methyl acridine chloride hydrochloride (Boots No. 812) gave a copious precipitate with silver nitrate. The total chlorine content was 23·64 per cent. The amount of chlorine calculated for the compound $C_{14}H_{14}N_3Cl.HCl$ is 23·98 per cent.

(iii)—Diamino-methyl acridine (May and Baker) gave a copious precipitate with silver nitrate. It is thus apparent that it is like the former compound a hydrochloride. The total chlorine content was found to be 23·56 per cent.

The first compound is a dark brownish-red crystalline powder, fairly soluble in water; the other two are red powders freely soluble in water. The two English products are supposed to be acriflavine. They differ from trypaflavine in being the hydrochloride salt.

Exhaustive trials in the Research Institute[1] demonstrated that these compounds have no curative effect in schistosomiasis. As an anthelmintic in ankylostomiasis they were tried in 4 cases. One patient received 4 g. of trypaflavine in 20 days (the daily dose was 0·2 g.) and examination after two months revealed ancylostoma ova. The second received a total of 0·9 g. of trypaflavine in nine days (the daily dose 0·1 g.) and he was also still harbouring the worms after two months. The third had 0·2 g. daily for seven days. An ova count was made daily for ten days, and was found to range between 13 and 15; the stools were constantly positive for ova. The fourth received 0·2 g. of trypaflavine for seven days, and the daily ova count ranged between 2 and 3 ova during ten days. No worms were expelled in the last two cases. The stools were collected daily and searched for worms. Thus trypaflavine has no anthelmintic action in ankylostomiasis, and it does not affect the number of ova laid by the worms.

I am, Sir, yours faithfully,

M. KHALIL,
Director, Research Institute, Public Health Department, Cairo.

Oct. 22nd.

THE DETECTION OF THYROTOXICOSIS

To the Editor of THE LANCET

SIR,—Those of us who are daily preoccupied by the need for some reliable test for thyrotoxicosis would have reason to heave profound sighs of relief if experience had made it possible to support Mr. Lambert Rogers's advocacy of Goetsch's test. To warrant faith in any test for toxic goitre it appears to me to be essential that:—

(1) It must be "positive" in a high percentage of cases proved subsequently, both pathologically and clinically, to be thyrotoxic in nature.

(2) It must be "negative" in normal individuals and a portion in those suffering from thyroid deficiency.

When we examine Goetsch's test and its various modifications in the light of these criteria it proves fallacious on the following counts:—

(1) It is approximately as often "negative" as "positive" in cases of frank thyrotoxicosis. This is based on my own observation of over 1000 cases in which the test has been rigidly applied.

(2) It is "positive" in 20 per cent. of normal individuals (Van Wangenen).

(3) It is also "positive" in 65 per cent. of cases of "irritable heart" (Tomkins, Sturges, and Wearn).

(4) It is sometimes "positive" in myxoedema (Boothby).

Could unreliability be more strikingly exemplified?

In obscure cases Dr. Robertson's particular method of checking B.M.R. estimations before and after "saturation" of the patient with iodine will, I believe, prove in the long run to be infinitely more exact than Goetsch's test—in fact than any other

[1] Described by Prof. Khalil *Bey* in THE LANCET of Oct. 20th, p. 862.

test at present available. I am still in doubt as to the specificity of the "impedance angle" method so ably developed by Dr. Brazier, partly because it does not appear to be modified by iodine therapy as would be expected did it run parallel with thyrotoxic activity. I hope, however, that the difficulties associated with the interpretation of Dr. Brazier's test will eventually be cleared up; while they still exist I fear we must still rely on our clinical judgment backed up by careful estimations of the B.M.R.

I am, Sir, yours faithfully,

London, Nov. 19th. CECIL A. JOLL.

CURARA IN TETANUS

To the Editor of THE LANCET

SIR,—In his letter in your last issue, Dr. Leslie Cole mentions the "lissive" action of curara. Research on this subject is difficult and has marched slowly. Some curares do appear to be better than others in their power of selectively removing various conditions of muscle spasm both in animals and in man. The specimen used by Dr. Cole in his recently recorded cases of human tetanus has a moderate lissive power, as tested on parathyroidectomised dogs. Similar specimens reduce the rigidity of spastic paraplegia and of parkinsonian rigidity, in doses which produce no apparent paresis. It is, I think, this lissive property which Dr. Cole has now demonstrated for the first time in human tetanus.

The case of curarine is a different one. This alkaloid, though responsible for the ordinary paralysing action of curare, has not hitherto shown the power of removing pathological rigidities selectively. Curarine obtained from the same source as that which Sir Henry Dale supplied to Prof. Florey—a consignment of *Strychnos toxifera* sent to me from British Guiana—has been under pharmacological investigation in this laboratory during the past year. It has no lissive action on parathyroid tetany in dogs, or on the spastic paraplegia of a case of disseminated sclerosis. My supplies were insufficient for its trial in the one case of human tetanus to which I have recently had access, but I should not expect that pure curarine given subcutaneously would remove tetanus without causing coincident weakness. Nevertheless I hope that it may be of use in the treatment of tetanus, for I find that when given in toxic doses to man its action is to paralyse the muscles supplied by cranial nerves and the flexors and extensors of the neck, whilst only weakening those of the limbs and leaving respiration unembarrassed.

I hope that full reports upon the actions of active principles derived from various curares and from certain strychnos plants will be available shortly. But I think Dr. Cole is right in drawing the attention of Prof. Florey and his collaborators to the literature of selective actions of curare as offering a possible explanation of a discrepancy between their two findings. I am, Sir, yours faithfully,

RANYARD WEST.

University Department of Pharmacology, Oxford, Nov. 18th.

FITNESS FOR PUBLIC SERVICE

To the Editor of THE LANCET

SIR,—The Local Government and Other Officers Act, 1922, was intended to provide pensions for medical officers when they retired. It was not passed for the purpose of providing a public medical service personnel equal in physical fitness to that of the fighting services. But this is what is now happening.

It is common knowledge that many who now hold responsible positions as medical superintendents of sanatoria and as tuberculosis officers took up such work because they had had pulmonary tuberculosis at the start of their medical career. Many such doctors have given 20 years or more of useful work, but those of us now in a similar position find it absolutely impossible to obtain any post with a public authority, no matter for how long we may have been well and working. The actuarial basis of the superannuation scheme is a "first class life," and as such we are forthwith rejected, and this despite the fact that such employers as banks, insurance companies, &c., are constantly advised that sanatorium patients are fit for work and constantly accept them back, in many cases making special arrangements for them on their return. One of us has been working now for five years with an artificial pneumothorax, and the other of us for three years with an artificial pneumothorax, without symptoms of any sort, yet we find it impossible to obtain work with a public authority. We are working at a voluntary sanatorium, where the medical superintendent is allowed to exercise his sound clinical judgment in the selection of his medical officers.

Would it not be possible to use a little clinical judgment, instead of a rule of thumb rejection, or alternatively to assess the disability and ask for increased contribution for the superannuation fund—though this fund is a *retiring* and not a sickness benefit fund?

We are, Sir, yours faithfully,

FIVE YEARS ARTIFICIAL PNEUMOTHORAX, M.R.C.P. (Lond.).

THREE YEARS ARTIFICIAL PNEUMOTHORAX, M.D.

Nov. 19th.

IRELAND

(FROM OUR OWN CORRESPONDENT)

A MILK BILL

THE second reading of the Government's Milk Bill was carried without a division in the Dail last week. Dr. C. Ward, parliamentary secretary to the Minister for Local Government and Public Health, who was in charge of the Bill, said that the object was to improve the purity of the milk supply and to ensure its freedom from contamination and infection. Despite the value of milk as a food the consumption in Ireland was substantially below that in other countries, but it would be unwise to advocate a general increase in consumption of milk until precautions were taken to ensure that it was derived from healthy animals, and free from contamination and infection. The experiences of the scheme for providing free milk for necessitous children had shown that milk vendors were ready to adopt progressive methods. Discussion was concerned with omissions from the Bill which tended to diminish its effectiveness. In particular it was pointed out that no attempt was made to deal with the problems of tuberculosis in cattle as a whole, and that mere control of the production of milk was unlikely to abolish the possibility of infection by the tubercle bacillus. Attention was drawn to the absence of a definition of "dirty milk" and to the absence of any provision to empower a local health authority to inspect the production of milk outside its boundaries which might be offered for sale within its boundaries. The absence of any prohibition of the sale of milk without a licence was also criticised. The obvious difficulties of administration were stressed, and in particular the absence of any machinery for administration in those counties for which no medical

officer of health had been appointed. The Parliamentary Secretary expressed his sympathy with some of the objections raised and his willingness to give careful consideration to amendments that might be brought forward.

Dr. Ward also obtained the second reading of another Bill dealing with the milk supply—the Sale of Food and Drugs (Milk) Bill, 1934. He said that in present circumstances when a defendant offered evidence that milk which he had sold, which had been found to be deficient in fats, was as it came from the cow, and if that could not be disproved there could not be a conviction. The measure he brought forward provided that deficiency in fats would be conclusive evidence of an offence. This important change in the law was given a second reading without discussion. If it becomes law then all milk offered for sale must come up to the standard as regards fat content.

THE ST. JOHN AMBULANCE BRIGADE AND MATERNITY WELFARE

The St. John Ambulance Brigade has been carrying on for several years an important bit of work in maternity welfare in Dublin. For some months before and after their confinement women of the poorest class are supplied daily with free dinners in four dining-rooms in different quarters of Dublin. Last year no less than 48,000 such dinners were served, and, in addition the women were given 19,912 pints of soup to carry home. The entire work has been organised by the St. John Ambulance Brigade, which in the earlier years also made itself responsible for financing it. In recent years, however, the maternity welfare service of the city of Dublin contributes about two-thirds of the expense. The entire cost last year amounted to £1159, or approximately 5¼*d.* per dinner.

PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS

ON Nov. 16th the Royal Assent was given by Royal Commission in the House of Lords to the Betting and Lotteries Act, the Expiring Laws Continuance Act, the Poor-Law Act, and other Acts.

Medical Certificates of Fitness for Marriage

In the House of Lords on Nov. 14th Lord KILMAINE moved:

"That the marriage laws should be so amended as to make it obligatory for both parties to the proposed marriage to produce medical certificates of fitness when they come before a minister of religion, or the civil authority."

The certificates should be signed by some competent medical authority; the fee for them fixed at as low a figure as possible; and some steps taken to ensure that the answers given were true. He proposed four certificates: (1) Certificate "A," the "All clear," showing that the parties were perfectly fit to marry and to raise a family; (2) Certificate "B," which would show that for some reason of health it was advisable that there should be delay, but that the parties might present themselves again three or six months hence—this would be a most important provision in the case of suspected venereal infection; (3) Certificate "C," which would say that the parties could marry without danger to each other, but for family or other reasons it must be a childless marriage. It was wicked and criminal to bring children into this world unless there was a reasonable prospect of their being able to lead healthy, happy, and useful lives. Some form of birth control must be employed for the unfit; he hesitated to suggest sterilisation. (4) Certificate "D," would prohibit marriage altogether.

That certificate would be given in a case in which it would be considered that not only would there be danger to the children, but that there would be definite danger to the parties themselves. He hoped that by Certificate "D" the parties would be helped to realise that they had had a lucky escape. He also hoped that Certificates "B" and "C" would come to be regarded by the parties themselves as necessary safeguards against much misery and unhappiness both to themselves and to any possible offspring. Besides the menace of hereditary disease there was the further problem of close in-breeding. Too often the result of marriages, owing to close blood relationship, was that the children, though physically well-developed, were mentally deficient. The asylums of the country were full of such people. The cost to the State of the public mental institutions of this country must be enormous. In the case of one big county asylum the statistics were staggering. He could not reconcile the extraordinary care taken by breeders of pedigree stock, pedigree herds, pedigree dogs, and other animals, with the almost total neglect of the human race. Practically nothing was done to protect the next generation.

The fearful increase of damaged and useless lives must, Lord Kilmaine concluded, be prevented somehow, both for the sake of the race as a whole, and for the sake of the individuals themselves.

The Bishop of NORWICH said he would have liked to associate himself with the proposal, but he did not think it was possible to draw a parallel between the breeding of the human race and the breeding of stock. Marriage was not the only door to procreation, and he was afraid there were many who, failing to receive any of the certificates suggested, would still not be restricted from forming alliances from which children might result. The certificates themselves involved great difficulty. There were many gradations in the want of complete mental power, and at the present time our knowledge of these disorders and our equipment for dealing with them in private and public ways were limited. Many mental disorders were intermittent in their effect. They might find someone perfectly clear mentally in himself or herself, and yet he or she might carry a taint into a further generation. He could see extreme difficulty in disqualifying for marriage people who had shown no sign of disorder, simply because some other generation behind them had shown signs of mental disaffection, and yet these people might be the very ones who could not be safely trusted to rear families. At the same time they needed a ripe opinion on all these questions of eugenics. The birth-rate among undesirable stocks proceeded more rapidly than among the more promising stocks of the community. It was a national menace, but he did not think isolated action of this sort would be any good.

The ARCHBISHOP OF CANTERBURY asked what was the nature of the fitness into which inquiries were to be made? Was it merely for the production of children, or for reasons of health and nerve, and the like? But, most of all, who was to certify? If every married couple was obliged to produce a medical certificate, was it to be some State official before whom they were to go? Were they to pay a small fee for an investigation by some State official, as if they were to be "vetted" like horses? How was the private practitioner to take the responsibility, except in the case of a clear-cut "All is well"—the Certificate "A," or the quite definite Certificate "D," involving prohibition? The intermediate certificates would place an onus upon a private medical practitioner which required a great deal more thinking out before they could agree to it. Again, what was the unfortunate minister of religion to do if a couple brought Certificate "B"? It would put the minister, and the civil authority, in a quite impossible position. There would be, he supposed, some time a full discussion on the recent report on sterilisation and kindred subjects. That wanted the most careful consideration.

THE GOVERNMENT'S REPLY

Viscount GAGE said there was at least strong evidence of the desirability of limiting the right of marriage in regard to one class of person—the mentally defective. A recent committee on the sterilisation of mental defectives dealt with the matter from a somewhat different angle. But the evidence of that report had interest as showing the extraordinary volume of suffering and misery that so often afflicted the children of defective parents. With the legal marriage of mental defectives that committee did not deal, but the Board of Control had on several occasions recommended in strong terms that the marriage of mental defectives under order should be prohibited by law. At present the position, so far as he could ascertain, was that when they were in institutions they were incapable of marriage. For mental defectives under guardianship the consent of the guardian was required, but, as with minors, if a defective managed to get married by evading the guardian's consent, then the marriage was valid. The report stated:

"... our Board have in previous reports strongly recommended that the marriage of defectives under order should be prohibited by law. We realise that the proportion of defectives under order is so small that such a prohibition would only touch the fringe of the problem; but we believe that the statutory prohibition of marriage in these cases would have a value far beyond the actual number of cases to which it would apply, because of its effect in bringing home to the public conscience the unwisdom of countenancing unions the results of which are, from every point of view, nothing less than disastrous."

The departmental committee had recommended a form of voluntary sterilisation, but they were clearly of opinion that any hint of institutions being associated with compulsory sterilisation would lead to the concealment of defect. The loss or the qualification of the rights of marriage was a less severe step than sterilisation, but investigation of this kind would still have the tendency to drive underground facts which ought to be brought to the notice of the medical profession as soon as any suspicion was aroused. To some people of nervous temperament the dread of a medical examination would be a severe deterrent to a legalised marriage and might, in fact, tend to increase the number of illegitimate births. The Ministry of Health felt there was sufficient evidence, from experience extending over years, to justify them in testing public opinion in regard to the reports of the Board of Control and the committee on sterilisation. The latter had been circulated and was being considered at present by large numbers of interested institutions and bodies. Beyond that the Ministry could not go. There were undeniable evils in the present situation, some of which might be prevented, but it was necessary to carry the public with them at every step.

The motion was by leave withdrawn.

Opening of New Session: The King's Speech

The fourth session of the present Parliament was opened by the King in the House of Lords on Nov. 20th. In the course of his gracious speech from the Throne, His Majesty said that the report of the Joint Committee of both Houses on Indian Constitutional Reform was about to be presented, and it would be the duty of his ministers to lay before Parliament their legislative proposals for the future government of India. Although factors adverse to the full resumption of international trade still existed, it was His Majesty's earnest hope that the coming year would be marked by a continuance of the spirit of confidence and enterprise which had enabled this country to take the lead in world recovery.

The Government, in conjunction with the local authorities, were pressing forward with the task of clearing the slums, in regard to which the national conscience had been so deeply stirred. So great a measure of progress was being attained that the Government were able to contemplate the next step in the process of improving the housing conditions of the people. A Bill would accordingly be submitted for preventing overcrowding and making provision for the rehousing of those found living in overcrowded conditions. A similar Bill applying to Scotland would also be introduced. A measure would also be introduced to assist certain areas in which prolonged unemployment had created problems of an exceptional character. If time permitted measures would be introduced for the control of building development along the main thoroughfares, for providing for better housing for the metropolitan police, and other subjects.

HOUSE OF COMMONS

WEDNESDAY, NOV. 14TH

Insured Persons and Pension Rights

Mr. BUCHANAN asked the Minister of Health whether he would consider the introduction of legislation to amend the National Health Insurance Act of 1932, so as to extend the pension rights of unemployed people which otherwise would lapse at the end of 1935; and, if not, what steps he intended to take in the matter.—Sir HILTON YOUNG replied: I am not in a position at present to make any statement on this matter. I would, however, remind the hon. Member that I announced in the course of the debate on the second reading of the Bill of 1932 that the whole position would be reviewed when the first report of the Government Actuary on the financial operation of the Contributory Pensions Acts is received. I hope that that report will be available early in 1935.

Cost of Glasgow Institutions

Mr. MCGOVERN asked the Secretary of State for Scotland the weekly cost per head for every hospital, poorhouse, asylum, and sanatorium patient or inmate under the control of the Glasgow Corporation.—Sir G. COLLINS replied: I regret that no figures are available for sanatoria, infectious diseases hospitals, and mental defective hospitals. As regards other institutions the following statement gives the institution and average weekly cost for the year ended May 15th, 1934.

	s.	d.		s.	d.
Barnhill Poorhouse ..	17	2	Duncluths Home, Kirn	42	0½
Crookston Home	23	10½	"Girls' Training School," Dunoon ..	17	1½
Southern General Hosp.	24	4½	Gartloch Asylum ..	25	0
Eastern District Hosp.	37	5½	Woodilee Asylum ..	22	4
Western District Hosp.	42	6½	Govan Asylum ..	24	1
Stobhill Hospital	35	10			

THURSDAY, NOV. 15TH

Asbestosis

Mr. THORNE asked the Home Secretary the number of deaths from asbestosis; whether he had any statistics that showed how long was the period between contracting the disease and death; if he was satisfied that every precaution was taken to keep this disease in check; and whether he would take steps to have the regulations enforced in all parts of the factories, including the warehouses.—Sir JOHN GILMOUR replied: About 60 deaths have been brought to the notice of the Department, and after investigation are all attributed by the Senior Medical Inspector of Factories to exposure incurred previous to the Asbestos Industry Regulations of 1931, which require elaborate precautions. The disease usually takes years to develop, and the period between commencement and death varies very widely. Special inquiry in 1932 as to the risks in warehouse and certain other processes revealed no need for any extension of the regulations, but their effectiveness will continue to be closely watched.

Woman's Death in Manchester

Mr. LANSBURY asked the Minister of Health if he had any statement to make as to the publication of the report of the inquiry into the death of Mrs. Taylor.—Sir HILTON YOUNG replied: I have come to the conclusion that the circumstances of this case are so special as to justify an exception to the established rule against publication. I am so informing the City Council of Manchester, at whose request I caused the inquiry to be made, and the authorities of St. Mary's Hospitals, who concurred in the request.

Supply of Milk and Food to Children

Miss RATHBONE asked the Parliamentary Secretary to the Board of Education whether he would consider

withdrawing the restriction placed by Circular 1437 upon the freedom of local authorities to give milk or meals free to children on account of their parent's poverty without first requiring a medical inspection, in view of the dissatisfaction it had aroused and of the acknowledged difficulty of detecting the early signs of malnutrition.—Mr. RAMSBOTHAM replied: My noble friend is not prepared to withdraw the Circular. He is satisfied that medical selection on the lines indicated in the Circular affords the best means of securing that these children who need food or milk in fact get it, and that under any system other than that of medical selection there is a danger of overlooking children who require attention. He attaches the highest importance to a close study of defective nutrition and its treatment, and he regards it as in every way advantageous that this part of the work of the school medical service should be closely linked with the arrangements for the provision of meals and milk.

Miss RATHBONE: Is the hon. Member aware that the organ of the local education authorities has condemned this restriction on their freedom, and are not local authorities the best judges of what should be done in this matter?

Mr. RHYS DAVIES: Is it not much better to prevent children becoming ill rather than to deal with them after they are ill?

Mr. RAMSBOTHAM: I think that the system of medical inspection is much the best way of doing that.

Miss RATHBONE: Is not a cost for inspection of 7*s*. per child a large expenditure for the purpose of determining whether a child shall receive 2½*d*. worth of milk?

Mr. PALING: As the cost of medical inspection is so high, would it not be better to spend the money in giving milk to the children?

Maternity and Child Welfare Services

Miss CAZALET asked the Minister of Health what steps he was taking in areas where there had been a reduction of the amount spent on the maternity and child welfare services, in view of the fact that an additional amount of £5,000,000 was included in the general Exchequer contribution for each year in the first fixed grant period under the Local Government Act, 1929, to be used for the development of local services, including the development of the maternity and child welfare services.—Sir HILTON YOUNG replied: In any case where there has been such a reduction the first step is to ascertain the reasons for and the effect of the reduction. If there is reason to fear a reduction in the efficiency of the services I direct a local investigation and make the necessary representations to the local authority. The expenditure of the grant mentioned by my hon. friend is within the discretion of the local authorities, but it is a condition of grant that they shall maintain a reasonable standard of efficiency and progress in the discharge of their public health functions. The policy of the Government is to secure a development of the maternity and child welfare services, and steps have recently again been taken for that purpose. On other occasions opportunity has been taken to emphasise the claim of these services on the additional grant referred to.

Death from Vaccination

Mr. GROVES asked the Minister of Health whether his attention had been called to the death of a nurse at Birmingham from vaccination; whether he was aware that the operation was imposed by a Sheffield institution as a condition of employment; and whether, in view of such risks, he would advise the authorities of hospitals and similar institutions not to insist on the vaccination of their staffs.—Sir HILTON YOUNG replied: The answer to the first two parts of the question is in the affirmative. As regards the third part, I would refer the hon. Member to the reply which I gave to a question which he asked on July 26th relating to the case of Leonard George Jennings. "... the opinion has already been expressed in circulars issued by my Department that it is not generally expedient to press for the vaccination of children of school age or of adolescents who have not previously been vaccinated, unless they have been in personal contact with a case of small-pox or directly exposed to small-pox infection." (THE LANCET, August 4th, 1934, p. 284.) I may also refer to the remarks on this subject which are contained in the annual report of the Chief Medical Officer of my Department for 1933.

PUBLIC HEALTH CONGRESS AND EXHIBITION

THIS Congress was opened at the Royal Agricultural Hall, Islington, on Monday last under royal patronage and the presidency of Sir EDWARD HILTON YOUNG, Minister of Health. Sir FREDERICK J. WILLIS, Chairman of the Congress Council, presided at the opening function, and the Minister opened the proceedings with a brief address, in the course of which he said that he was pleased that the subject of maternity and child welfare would come up for consideration in the conferences, as the Ministry proposed to hold special inquiries directed to abnormal local death rates. He also invited the local authorities to take a material interest in methods of health exercise and physical culture.

In the afternoon Sir ARTHUR ROBINSON, Secretary to the Ministry of Health, took the chair when an address was delivered by Sir GEORGE BUCHANAN, President of the Office International d'Hygiène Publique, on the international arrangements for preventing the spread of epidemic diseases.

Sir George Buchanan invited the audience to inquire with him into the progress made by international methods in post-war years, pointing out the increased coöperation with fellow workers now taking place on almost every technical subject in foreign countries and in our own dominions. This cosmopolitan tradition, he said, was represented during the war by the activities of Red Cross in terms of curative treatment, while the tradition had always been strong in medicine and public health. He instanced, as an example of its working, the International Congress at Zurich on radiotherapy held this summer, when physicists, radiologists, physicians, and surgeons from all parts of the earth made contacts, while the magnitude of the cause they were engaged on put into the background of their thoughts the political happenings in Austria and Germany between July 20th and August 3rd. Radiotherapeutic work was being done in a few institutes scattered all over the world, and the Zurich Congress had not met for a combat of views between their representatives, but to learn from them of their activities and to secure that proper reports should be forthcoming of successes and failures. He spoke of other international congresses on health held in different countries during the past year as exceeding a hundred in number, and as showing that to-day in almost any expert work international consultation is seen to be required. In some countries such as Soviet Russia every medical and public health activity, he mentioned, was State directed, and he quoted from the Covenant of the League the significant words that members of the League "will endeavour to take steps in matters of international concern for the prevention and control of disease," and indicated the way in which the Assembly of the League had discharged this responsibility. The health organisation at Geneva had resulted, he stated, in meetings of experts on such subjects as malaria, leprosy, and sleeping sickness, in interchange visits, and in conferences on cancer statistics, on international standards, and on the definitions to be adopted for serums, vaccines, and vitamins.

Concerning all such work it had to be remembered that the organisers enjoyed the advantage of occupying new ground, but international measures for the control of the introduction of infectious diseases were in a different position. Schemes to this end

had been the subject of international or diplomatic intervention since the Middle Ages, and so strong was tradition that it was difficult to change methods which had fallen out of date in the presence of modern ideas of knowledge and sources of intercommunication. With regard to sanitary organisations for the defence of frontiers and quarantine services at ports, the reason is lost for apprehension of widespread epidemics; pre-war international sanitary conventions had played here a useful part, but they dealt with elaborate defence systems, while new methods of international coöperation were required to be directed against the diseases themselves. And he instanced, as a good example of the change over that was displayed the regulations with regard to plague-infected rats where rules for international sanitation concerned the actual plague infection on the ship, but where the root of the trouble—namely, the ship-rat itself—is also dealt with. Noting that the same principle had been applied in different ways to other diseases, he considered at some length the question of the importation of small-pox. In our country two different types were distinguished, variola minor and variola major under the name of small-pox. Variola major, epidemic and persistent in the East, when imported into England will breed true, but by meeting such cases before they got a hold on the local population through isolation, surveillance of contacts, and vaccination, tragedies could be averted. Variola minor he described as practically an English disease, stopping with the first rash and attended by no pustulation or pitting, and having an almost negligible mortality. These cases had to be termed small-pox, and their existence gave to foreign countries, which had no experience of variola minor, the impression that in this country small-pox, as they understood the disease, was epidemic.

Concerning the possibility of importation of infectious disease by aircraft, the speaker said that with any sort of vision we must appreciate that travel by air was increasing, and although the total number of passengers must be but a small fraction of the whole, there was, he said, already proof that this fraction could carry infections—for example, travellers from a non-malarious country could contract malaria in the course of an ordinary journey from the bites of infected mosquitoes. He pointed to the absurdity of old-fashioned quarantine regulations in this situation and said: "If the notion of putting passengers by sea and the ships they go in under special observation for no other reason than that the ship has touched at a seaport labelled as infected is now out of date and usually futile, how much more futile is it when applied to airports? . . . The International Sanitary Convention for Aerial Navigation had now hammered out an international code of conduct—on the one hand something practical and reasonable from the side of air traffic, and on the other something which, when it had to be applied, would offer a substantial security without illusory formalities." Sir George pointed to two key positions, generally relied upon in the detention of arrivals in an infectious state. The first was that the airports open to arrivals should be few, and that at them the recent movements of particular persons, coming from distant countries and exposed to particular infections, should be subject to interrogations which would secure over them the surveillance that would be imposed if they had arrived at a seaport. The second was the establishment of an international intelligence system.

Local authorities and public health officers sometimes could help the work materially. There is much take as well as give. The gain as regards our escape from infectious disease in consequence of the international coöperation could not be assessed in figures, but Sir George concluded by claiming that "the extreme rarity of these importations, notwithstanding modern facilities of communications, when contrasted with the experiences of the end of the last century and the pre-war period, in which we relied almost wholly on our own 'defence' measures, are some testimony to the value of the willing international coöperation I have outlined. I would insist on its willingness; in my experience the best work has been done by avoiding any semblance of international expert dictation, any suggestion of international inspection, or any interference with national administration. It has been achieved by working steadily for conferences and agreements between responsible health officers throughout the world, determined to help one another to carry out their respective national duties."

Team Work for Maternity

On Tuesday a discussion on antenatal and postnatal care was held under the auspices of the Association of Maternity and Child Welfare Centres, Dr. Charles Porter (M.O.H., St. Marylebone) presiding.

Prof. F. J. BROWNE (director, Obstetric Unit, University College Hospital) pointed out that almost every disease to which women are liable may be associated with pregnancy, so that antenatal care not only implies supervision of the expectant mother by a competent obstetrician, but also coöperation by him with the gynæcologist, the radiologist, the bacteriologist, and others. The man in the street endows every physician with superhuman powers, but most doctors are humble enough to admit that they cannot hope to be adept in more than one department, and that if the patient is to have the best chance, association with colleagues who have specialised in other branches of medicine is necessary. One lamentable example of lack of coöperation which seriously handicaps medical officers of municipal antenatal clinics is the gap between diagnosis and treatment. Medical officers at the clinics are not allowed to give treatment; the patient must be referred to her own doctor, who is often too indifferent or too much occupied to give her the treatment she needs. The time has come, Prof. Browne said, to bridge this gap by taking midwifery out of the hands of general practitioners altogether, and establishing a service of specialists thoroughly trained in obstetrics, to work in coöperation with highly trained nurse-midwives, this team being responsible for the care of the patient during pregnancy and delivery. The general practitioner is unsuited for midwifery work for the following reasons: (1) the practice of midwifery calls for a long specialised training which it is impossible to give to the undergraduate medical student. Nothing less than three years' postgraduate practice in a large maternity hospital is sufficient to acquire the necessary skill. (2) In the course of his work the general practitioner is continually in contact with septic wounds, and he may have to go direct from such a case to a midwifery case, with grave risk of infecting his patient. (3) Midwifery practice is incompatible with the claims of general practice. It occurs at irregular times and interrupts the doctor's ordinary work, entailing dangerous haste. Our failures in antenatal care and our high maternal death-rate will only be overcome by a specialist service in which team work will replace the chaos and confusion which at present characterise the midwifery service of this country.

Dr. LETITIA FAIRFIELD (Public Assistance Department, London County Council) said that, having had experience of various methods of antenatal care, we are now faced with the fact, if we take the maternal mortality-rate as a test, that it has not done what we were told it could do. It may be said that this is because we have not had enough antenatal care, or because it has not been properly organised or carried out. But there are further factors to be considered. Some of the lowest maternal mortality-rates are found in large areas where practically no antenatal work is done. The good results obtained by certain associations of midwives suggest that antenatal care may greatly reduce the deaths due to childbirth. It must, however, be remembered that antenatal care protects the nurse as well as the patient. Bad potential risks may be transferred elsewhere for confinement; if we consider hospitals which have their own clinics and take emergency cases, it appears that the death-rate does not diminish in relation to the amount of antenatal work. Again facts belie theories in the connexion between antenatal care and malnutrition. The highest mortality is not found among the very poor in the great towns, and some of the wealthier London boroughs show a higher maternal death-rate than their poorer neighbours. This is not to belittle the importance of nutrition, but it would be a mistake to think we can greatly improve maternal mortality by concentration on that one factor. We need to get our antenatal work into focus, remembering that the process of childbirth is a continuous one, and it is no good concentrating on antenatal care unless we give equal attention to other matters. Antenatal care is an essential part of obstetrics, not a specialised stunt by itself, and the expectant mother is not an ambulant pelvis, but a woman with human needs, whose soul and body are closely interlocked. In our zeal for coöperation between doctors, midwives, and public bodies, let us not forget the mother on whose coöperation success largely depends. Wherever the antenatal clinic is situated, and whoever the staff, it should be conducted in close coöperation with the resources of the great modern hospitals.

Dr. URSULA COX (assistant medical officer for M. and C.W., Birmingham) gave a clear and detailed account of the admirable service provided in that city, the largest municipal unit in England. The majority of midwives in Birmingham, she said, send their patients to the clinics for antenatal care. They are invited to attend, with their patients, and reports are sent to them. If a patient has to be taken from the midwife, because of any complication, the midwife is compensated. Coöperation with local doctors is also good. The service of home-helps has been extended, and is now available in any sort of emergency to enable the mother to leave home without anxiety.

Dr. R. VEITCH CLARK (M.O.H., Manchester) supported Prof. Browne as to the need of an obstetric panel—a group of medical men and women who have devoted time and study to the subject, and who are recognised as experts capable of taking charge of maternity cases. In any abnormality the midwife is obliged to summon medical help: why should not the patient have special attention from someone on whom complete reliance can be placed? He urged the necessity for improving the conditions of practice by midwives; we cannot expect, he said, a really good maternity service unless we have a happy contented body of midwives, making a reasonably good living.

The key position of the midwife was further emphasised by Dr. G. F. MCCLEARY, who also dwelt on the importance of the human element. One of the most necessary factors in a satisfactory scheme is the provision of more beds for pre-maternity cases. Yet places well supplied with such beds find it difficult to get women to use them. The mothers must be convinced that it is for their own good to accept institutional treatment, and the midwife has more influence than anybody else.

Dr. J. C. SLEIGH (M.O.H., Chelmsford) expressed regret at the suggestion that the general practitioner should be taken out of the midwifery service; he regards him as the root and foundation of antenatal work, believing that he should be responsible for supervision of his own maternity cases, passing them on to municipal clinics in case of abnormality with which he cannot deal. Nobody else has so intimate a knowledge of the patient as her own doctor.

In reply, Prof. BROWNE reiterated his conviction that the medical student cannot be educated to become a good practitioner of midwifery. The general practitioner probably does not attend more than 30 to 50 confinements in a year; of these four or five may be abnormal, and each of those in a different way. The midwife should be the backbone of any obstetric service. The present standard of entry is much too low, and the whole service needs to be raised to the status of a real career.

Appointments

ENRIGHT, J. F., L.R.C.P. Irel., has been appointed Obstetric Physician to the Sussex Maternity and Women's Hospital.

KELLY, F. C., M.R.C.S. Eng., Honorary Anæsthetist to University College Hospital.

HODGSON, N., M.S. Durh., F.R.C.S. Edin., Lecturer in Surgery, University of Durham College of Medicine.

RALPHS, F. G., M.B., F.R.C.S., of Ashton-under-Lyne, Medical Referee under the Workmen's Compensation Act, for Oldham County Court District (Circuit No. 5).

SLAUGHTER, E. V., M.R.C.S. Eng., Honorary Medical Officer to the Acton Hospital.

TURNER, J. M., M.B. Lond., F.R.C.S. Eng., Honorary Orthopædic Surgeon to the Royal Alexandra Hospital for Sick Children, Brighton.

Royal Southern Hospital, Liverpool.—The following appointments are announced:—

BAKER-BATES, E. T., M.D. Liverp., M.R.C.P. Lond., Honorary Assistant Physician;

MACKENNA, R. M. B., M.D. Camb., M.R.C.P. Lond., Honorary Dermatologist; and

HOPKINS, FREDERICK, M.D. Belf., Honorary Dermatologist.

Certifying Surgeons under the Factory and Workshop Acts: Dr. F. J. NEWALL (Ashford District, Kent); Dr. L. G. CAMPBELL (Earlston District, Berkwickshire); and Dr. W. A. S. COUPER (Port Glasgow District, Renfrewshire.

Births, Marriages, and Deaths

BIRTHS

AINSWORTH.—On Nov. 13th, at Ashington, Glastonbury, the wife of Richard Murray Ainsworth, M.B. Liverp., of a daughter.

CORDINER.—On Nov. 16th, at Upper Wimpole-street, W., the wife of G. R. Mather Cordiner, M.B. St. And., of a daughter.

GLANVILL.—On Nov. 3rd, the wife of Reginald Glanvill, M.R.C.S. Eng., of The Bolt, New Lodge, Windsor Forest, of a son.

MARRIAGES

MONKHOUSE—TELFORD.—On Nov. 10th, quietly at St. Elphege's Church, Wallington, Eric L. Monkhouse, M.R.C.S. Eng., to Betty Telford.

DEATHS

BRODRIBB.—On Nov. 10th, at Hove, Sussex, Ernest Brodribb, Lt.-Col. R.A.M.C. (Retired), late of Warminster, Wilts., aged 61 years.

COATES.—On Nov. 14th, the result of an accident at Maidenhead, Vincent Middleton Coates, M.C., late Captain R.A.M.C., M.D. Camb., M.R.C.P. Lond., of Bath, aged 45.

GRIFFITH.—On Nov. 11th, at Fox-hill, Combe Down, Bath, Augustine Griffith, M.D. Lond., late M.O.H., Hove, aged 68.

KERR.—On Nov. 17th, at a London nursing-home, Hugh Kerr, M.D. Glasg., Medical Superintendent, Bucks Mental Hospital, Stone, Aylesbury.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

OBITUARY

WILHELM HIS, Jun.

Prof. His, who died last Sunday, retired two years ago from the chair of clinical medicine in Berlin which he had held for 25 years. He did not long survive the celebration of his seventieth birthday last Christmas. Wilhelm His the younger was born in Basle where his father, who was of Swiss parentage, was professor of anatomy. Wilhelm His the elder was called in 1872 to Leipzig, where he divided with Carl Ludwig the chair of anatomy vacated by Weber, Ludwig taking physiology and His anatomy. Leipzig was at that time the centre of culture in Southern Germany and the young Wilhelm moved in a circle of jurists, publishers, and musicians which helped to form his outlook. After returning to Switzerland for military service he spent some time with Oswald Schmiedeberg at Strassburg where he acquired the rudiments of his knowledge of metabolism, and at the age of 26 he became Curschmann's assistant at Leipzig and began with Ernst Romberg his work on the nervous mechanism of the heart. It was characteristic of Curschmann's influence that all his assistants cherished the ambition of founding physiological clinics of their own. After working for four years on the heart ganglia his discovered the band of muscle-fibres running from auricle to ventricle which still bears his name. A little later (1895) he noticed that destruction of this connecting band led to dissociation of auricular and ventricular rhythms, and in 1899 (the same year as Wenckebach) he described heart block in man based on polygraphic curves. In 1901 he went on to Dresden to take charge of the hospital there, returning for a time to his native Basle, until in 1907 he was called to succeed Ernst von Leyden in the Berlin chair. There, apart from his heart studies, he gave much attention to gout and its metabolism and the diseases of the blood. Brought up as he was it was natural for him to attach importance to inherent structural peculiarities and he was largely responsible for the revival of the doctrine of diathesis in Berlin. This he defined once as an individual state, congenital or hereditary, in which physiological irritants cause an abnormal reaction and conditions of life normal for the majority of the species give rise to morbid states; he believed that only a few symptoms are specific for the individual diathesis, the majority being common to several, so that it is difficult to draw lines of demarcation. He adhered throughout to diatheses such as the arthritic, rachitic, exudative, and spasmophilic. His was one of the most popular teachers in Berlin, partly owing to his philosophic background, partly to his vivid presentment of clinical facts. During the war he was consulting physician to an army corps, and he afterwards wrote "Die Front der Aerzte" which had a wide circulation outside the medical profession.

WILHELM HIS

The photograph is reproduced from Lehmann's Gallery of Famous Doctors and Naturalists. (Suppl. Münch. med. Woch., 29 Dec., 1933.)

VINCENT MIDDLETON COATES, M.D. Camb., M.R.C.P. Lond.

WE regret to announce the death of Dr. Vincent Coates, the well-known Bath physician, as the result of an accident.

Vincent Middleton Coates was born in 1889 the son and the grandson of Bath physicians. He was educated at Monkton Combe, Haileybury, and Cambridge, doing afterwards his clinical work at Bristol. He took the English double qualification in 1915 and the doctorate in medicine at Cambridge in 1920; in 1926 he obtained the diploma of M.R.C.P. Lond. His medical career was interrupted by the war. He became attached to the 100th Field Ambulance, 33rd Division, and as M.O. of this regiment he gained the M.C. which was awarded to him for conspicuous gallantry on the Somme. He was then posted to Salonika, where he worked in the laboratories and the front line. The portrait adjoining shows him at this time of life.

DR. COATES

[Photograph by W. Clark

At the termination of the war he took up medical work in the house which had been his grandfather's. His own qualities and his hereditary influence enabled him rapidly to acquire a big practice. He was elected physician to the Royal Mineral Water Hospital, Bath, and the Bath Royal United Hospital, being at the time of his death senior physician at the institution. In Bristol he was assistant physician to the Royal Hospital for Sick Children and Women, and lecturer in medicine to the dental students of the University. He threw himself with energy and enthusiasm into medical work, his obvious opportunity being furnished by the scourge which rheumatic infections entail on all classes, as evidenced by the presence in Bath of so many examples. He held that the pain of rheumatoid arthritis was as terrible as that of malignant disease, and he was always engaged in the attempt to arrive at treatment from a scientific point of view, associating with it the mental and moral nature of the patient. For 14 years he worked among rheumatic patients, striving to give them mental and spiritual help as well as medical treatment, and in suitable cases his work of relief seemed almost miraculous. He served on many ad-hoc committees and brought to their deliberations the fruits of first-hand experience, and he was personally

known to physicians working at the problems presented by rheumatism in Germany, France, Italy, Belgium, Austria, and Hungary, in all of which countries he numbered personal friends. His early realisation of the importance of panniculitis and menopausal arthritis showed his qualities as an observer and he was working at the time of his death with Sir John Farmer to secure the means and facilities for establishing and maintaining a research laboratory for long-range work on rheumatism at the Mineral Water Hospital. This hospital, which is about to celebrate its bicentenary, is a national institution confined to caring for poor patients, and Coates's efforts furnished a proof of his interest in long-range research on arthritic disease as a whole. He made many communications to the medical press on the treatment of rheumatic conditions, and recently, in collaboration with Dr. J. L. Delicati, his colleague at the Royal Mineral Water Hospital, Bath, he wrote on the treatment of rheumatoid arthritis and on the correlations between certain rheumatic conditions and occupations, both books being the result of wide personal experience.

Dr. Rupert Waterhouse sends us the following personal tribute to Vincent Coates, which shows the high opinion of both the personal and scientific qualities with which he was regarded among his colleagues: "Vincent Coates aimed high and nothing satisfied him but the best. After his return from the war he was appointed visiting physician to the Ministry of Pensions Hospital, Bath, and physician to out-patients at the Royal Hospital for Sick Women and Children, Bristol. This latter post gave him a special interest in the diseases of children which continued during his post as assistant physician to the Royal United Hospital, an interest soon to be eclipsed however by the intense enthusiasm with which he attacked the problems presented by rheumatic diseases when, in 1921, he was elected physician to the Royal Mineral Water Hospital. Not only did he study the subject intensively from clinical and biochemical aspects, but he also attended numerous conferences on rheumatism both in this country and abroad, and had visited, at one time or another, all the chief British and continental spas. It must not be imagined however that it was as a 'spa' physician only that he excelled. He possessed diagnostic ability of a high order, and showed the hall-mark of the first-class physician in that, though impulsive and downright by nature, he was never hide-bound in his convictions but was ever ready to revise his estimate of a case. At the time of his death he was president of the Clinical Society of Bath whose members he had charmed by his conduct in the chair, for he always appeared at his best in the position for which nature had seemed to design him—the top."

Coates as a young man was a footballer of great prominence. Going up to Cambridge, after having captained the Haileybury team, he received his blue as a freshman, while subsequently he played constantly for Somersetshire and was "capped" for England five times. With the interval of war his active part in the game ceased, but he remained always deeply interested in the progress of the game.

Dr. Vincent Coates married during the war Ethel Layton of Essequebo, British Guiana, but there were no children of the marriage.

MEDICAL NEWS

University of Cambridge

On Nov. 17th the following degrees were conferred:—

M.D.—R. B. Mayfield (by proxy) and R. W. Butler.
M.B., B.Chir.—P. H. R. Ghey, B. S. Jones, J. C. G. Anderton, and R. Q. Parkes.
M.B.—A. M. Barrett.

A John Lucas Walker studentship, of an annual value not exceeding £200, will shortly be awarded. Further information may be obtained from Prof. H. R. Dean at the department of pathology, who will also receive applications till Dec. 1st.

The committee for medical radiology and electrology have approved the thesis of Mr. R. F. Phillips for the diploma in medical radiology and electrology.

University of London

On Nov. 22nd the annual reception of the University was held at South Kensington. Honorary degrees were conferred among others on Lord Halifax, Sir Austen Chamberlain, Sir Cooper Perry, M.D., and Prof. Karl Pearson, F.R.S.

National Association for the Prevention of Tuberculosis

The main subject of discussion at the twenty-first annual conference of this association, to be held at Southport from June 27th to 29th, 1935, will be the responsibility of the nation towards the child in respect of tuberculosis.

The Society of Apothecaries

A Yeomanry Dinner will be given by the Society on Tuesday, Dec. 11th, at their hall in Water-lane, London, E.C. Among the guests who have already accepted are Sir Hilton Young, Minister of Health; Sir Arthur Robinson, Secretary to the Ministry of Health; Vice-Admiral Hall, Medical Director-General of the Navy; General Hartigan, Director-General of the Army Medical Services; Dr. Robert Hutchison, President of the Royal Society of Medicine; and Lord Horder, President of the Medical Society of London.

Institute of Medical Psychology

The academic council of the University of London has passed a resolution recognising this institute as an approved clinic in connexion with the post-graduate diploma in psychology.

Aberdeen Royal Infirmary

At a meeting of the directors on Nov. 8th, Mr. William Anderson was appointed third surgeon. In asking Mr. G. H. Colt to remain a member of the consulting staff the board passed a resolution recording appreciation of the great and self-denying services he has rendered to the infirmary and to the people of north-east Scotland. Mr. Colt is now established in consulting practice in London.

Contraceptive Methods

The National Birth Control Association has appointed a medical sub-committee, consisting of practitioners actively engaged in the teaching of contraception, to collect, coördinate, and from time to time draw up for publication, authoritative information on all aspects of contraception for the use of the medical profession. The committee would therefore be glad to hear from any doctor, clinic or manufacturer interested in birth control, in order that it may have the fullest possible sources of information. Communications should be addressed to the secretary of the Association, 26, Eccleston-street, London, S.W.1.

A Scientific Laboratory at the Metropolitan Police College

Dr. James Davidson, lecturer on morbid anatomy at the University of Edinburgh, and senior pathologist to the Edinburgh Royal Infirmary, has been appointed to direct a laboratory which is to be added to the equipment of the Metropolitan Police College at Hendon. His main duties will be to assist in the investigation of criminal cases, to give instruction in scientific methods of crime detection to students at the college and at Peel House and to other members of the force, and to undertake research work.

St. Mary's Hospital Medical School

The governing body of this school has decided that after Oct. 1st, 1935, admission to the school will be restricted to students taking university degrees. In practice this means the universities of London, Oxford, and Cambridge. In making this announcement the dean, Dr. C. M. Wilson, states that for some years St. Mary's has given preference to students taking university degrees in the selection of its annual entry. It is now prepared to take the further step of committing the school to this policy.

The Conjoint Board

The offices of the Examining Board in England by the Royal College of Physicians of London and the Royal College of Surgeons of England at the Examination Hall, Queen-square, W.C. 1, will be closed on Thursday, Nov. 29th next, on the occasion of the Royal Wedding.

Royal Lancaster Infirmary

Lady Sefton will open the final extension of this infirmary. The sum of £65,000 has already been secured out of the £75,000 needed.

Medical Diary

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.
MONDAY, Nov. 26th.
Odontology. 8 P.M. Mr. A. H. Parrott and Mr. A. W. Wellings: The Aftermath of Apicectomy. Mr. J. G Turner: Maxillary Deformity due to Birth Injury. Dr. E. Matthews: Silicate Cements.
TUESDAY.
Medicine. 5 P.M. Discussion on the Ætiology and Treatment of Asthma. Dr. John Freeman, Dr. J. L. Livingstone, Dr. George Bray, Mr. C. Gill-Carey, Prof. Ernest Frankel. Members of the Section of Laryngology are invited.
WEDNESDAY.
Comparative Medicine. 5 P.M. Discussion on Nutritional Anæmias; Mineral Deficiency, Gastric and Liver Deficiency. Prof. J. B. Orr and Dr. H. H. Green.
THURSDAY.
A Special Meeting (for Fellows only), 9 P.M. Prof. G. R. Minot (Harvard): Some Aspects of Anæmia.

BRITISH PSYCHOLOGICAL SOCIETY.
WEDNESDAY, Nov. 28th.—8.30 P.M. (36, Gloucester-place, W.), Dr. Sylvia Payne: Femininity and Passivity.

MEDICAL SOCIETY OF LONDON, 11, Chandos-street, W.
MONDAY, Nov. 26th.—8.30 P.M., Mr. Hugh Cairns: The Value of Accessory Methods in the Diagnosis of Intracranial Tumours and Allied Conditions.

ST. JOHN'S HOSPITAL DERMATOLOGICAL SOCIETY, 49, Leicester-square, W.C.
WEDNESDAY, Nov. 28th.—5 P.M., Mr. Norman Lake: The Surgery of the Sympathetic Nervous System in Relation to Cutaneous Lesions.

SOCIETY OF MEDICAL OFFICERS OF HEALTH, 1, Upper Montagu-street, W.C.
FRIDAY, Nov. 30th.
Fever Hospital Medical Service Group.—4 P.M., Dr. Greenwood: Puerperal Fever.
Maternity and Child Welfare Group.—8.30 P.M., Mr. John Fraser: Heredity and Mental Deficiency.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.
MONDAY, Nov. 26th to SATURDAY, Dec. 1st.—MEDICAL SOCIETY OF LONDON, 11, Chandos-street, W. Tues., 2.30 P.M., Dr. A. E. Clark-Kennedy: Goitre. Wed., 8.30 P.M., Dr. C. E. Lakin: Diet in Deficiency Diseases.—LONDON LOCK HOSPITAL, 91, Dean-street, W. Afternoon course in venereal diseases.—BRITISH RED CROSS CLINIC, Peto-place, N.W. Course in rheumatism, Tues. and Thurs., at 8.30 P.M.—INFANTS HOSPITAL, Vincent-square, S.W. Afternoon course in infants' diseases.—HOSPITAL FOR DISEASES OF THE SKIN, Blackfriars-road, S.E. Afternoon course in diseases of the skin. Courses arranged by the Fellowship are open only to members and associates.

WEST LONDON HOSPITAL POST-GRADUATE COLLEGE, Hammersmith, W.
MONDAY, Nov. 26th.—10 A.M., skin clinic ad medical wards. 2 P.M., gynæcological and surgical wards, eye and gynæcological clinics.
TUESDAY.—10 A.M., medical wards. 11 A.M., surgical wards. 2 P.M., throat clinic.
WEDNESDAY.—10 A.M., children's ward and clinic. 2 P.M., eye clinic and medical wards.
THURSDAY.—10 A.M., neurological and gynæcological clinics. 11.30 A.M., fracture demonstration. 2 P.M., eye and genito-urinary clinics.
FRIDAY.—10 A.M., skin clinic. Noon, lecture on treatment. 2 P.M., throat clinic.
SATURDAY, Dec. 1st.—10 A.M., medical wards, children's and surgical clinics. Daily at 2 P.M., operations, medical and surgical clinics.

LONDON SCHOOL OF DERMATOLOGY, 49, Leicester-square, W.C.
TUESDAY, Nov. 27th.—5 P.M., Dr. R. T. Brain: Virus Diseases of the Skin.
THURSDAY.—5 P.M., Dr. W. K. Sibley: Electro-therapeutics, (Chesterfield lectures.)

KING'S COLLEGE HOSPITAL MEDICAL SCHOOL, Denmark-hill, S.E.
THURSDAY, Nov. 29th.—9 P.M., Dr. J. L. Livingstone: Diagnosis of Pulmonary Tuberculosis.

NATIONAL HOSPITAL, Queen-square, W.C.
MONDAY, Nov. 26th.—3.30 P.M., Dr. C. P. Symonds: Organic Dementia, Aphasia, &c.
TUESDAY.—3.30 P.M., Dr. Collier: Epilepsy and its Variants.
WEDNESDAY.—3.30 P.M., Dr. Collier: Clinical Demonstration.
FRIDAY.—3.30 P.M., Dr. Kinnier Wilson: The Motor System.
Out-patient Clinic daily at 2 P.M.

CHARING CROSS HOSPITAL MEDICAL SCHOOL.
SUNDAY, Nov. 25th.—10.30 A.M., Dr. C. K. J. Hamilton: Anæmia in Childhood. 11.45 A.M., Mr. Norman Lake: Diagnosis and Management of Acute Appendicitis.

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, W.C.
FRIDAY, Nov. 30th.—4 P.M., Mr. J. D. McLaggan: Tuberculosis of the Larynx.
SATURDAY.—10.30 A.M., Mr. Harold Kisch: The Diagnosis of Sinusitis. 11.45 A.M., Mr. Archer Ryland: The Treatment of Sinusitis. 1.30 P.M., Mr. F. W. Watkyn-Thomas: Suppuration of the Middle Ear. 2.30 P.M., Mr. J. D. McLaggan: Demonstration of Clinical Cases in Out-patient Department. 4 P.M., Mr. C. Gill-Carey: Foreign Bodies in the Food and Air Passages. Œsophagoscopy.
SUNDAY.—10.30 A.M., Mr. W. A. Mill: Deafness. 11.45 A.M., Mr. Lowndes Yates: Diseases of the External Ear. 2 P.M., Mr. N. Asherson: Differential Diagnosis of Hoarseness. 3.15 P.M., Mr. W. G. Scott-Brown: Indications for Tonsillectomy. (Week-end Course.)

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION, St. James' Hospital, Ouseley-road, Balham, S.W.
WEDNESDAY, Nov. 28th.—4 P.M., Dr. Braxton Hicks: Some Mutual Difficulties of the Clinician and the Pathologist.

INSTITUTE OF MEDICAL PSYCHOLOGY, Malet-place, W.C.
MONDAY, Nov. 26th.—8.30 P.M., Dr. Leonard Seif: Principles and Practice of Individual Psychology.
TUESDAY.—6 P.M., Dr. H. Crichton-Miller: Educational Ideals and the Destinies of Peoples.

BRITISH RED CROSS SOCIETY'S CLINIC FOR RHEUMATISM, Peto-place, N.W.
THURSDAY, Nov. 29th.—8.30 P.M., Dr. S. G. Scott: The Value of Radiology in Chronic Rheumatic Arthritis.

HAMPSTEAD GENERAL AND NORTH-WEST LONDON HOSPITAL.
WEDNESDAY, Nov. 28th.—4 P.M., Mr. H. Lawson Whale: Examination of a Case of Deafness.

INSTITUTE OF HYGIENE, 28, Portland-place, W.
WEDNESDAY, Nov. 28th.—3.30 P.M., Sir Stanley Woodwark: Measures to be Adopted in the Prevention of Diseases of the Ductless Glands.

ST. PAUL'S HOSPITAL, Endell-street, W.C.
WEDNESDAY, Nov. 28th.—4.30 P.M., Mr. Claude Mills: Some Interesting Urological Cases.

BRITISH SCIENCE GUILD.
WEDNESDAY, Nov. 28th.—4.30 P.M. (Goldsmith's Hall, E.C.), Prof. J. B. S. Haldane: Human Biology and its Applications. (Norman Lockyer lecture.)

HOSPITAL FOR EPILEPSY AND PARALYSIS, Maida Vale, W.
TUESDAY, Nov. 27th.—5 P.M. (Royal Society of Medicine, 1, Wimpole-street, W.), Mr. Wilfred Trotter: A Landmark in Neurology.

LEEDS PUBLIC DISPENSARY AND HOSPITAL.
WEDNESDAY, Nov. 28th.—4 P.M., Mr. A. Gough: Maternal Mortality.

LEEDS GENERAL INFIRMARY.
TUESDAY, Nov. 27th.—3.30 P.M., Mr. Symons: Demonstration of Surgical Cases.

MANCHESTER HOSPITAL FOR CONSUMPTION AND DISEASES OF THE EAR, NOSE, THROAT, AND CHEST.
WEDNESDAY, Nov. 28th.—4.30 P.M., Dr. Simon Kelly: Asthma.

GLASGOW POST-GRADUATE ASSOCIATION.
TUESDAY, Nov. 27th.—3.30 P.M. (Faculty Hall, Vincent-street), Dr. John Cowan: Prognosis of Chronic Heart Disease.
WEDNESDAY.—4.15 P.M. (Royal Maternity and Women's Hospital), Prof. S. J. Cameron: Obstetrical Cases.

MANCHESTER ROYAL INFIRMARY.
TUESDAY, Nov. 27th.—4.15 P.M., Mr. Harry Platt: Bone Setting.
FRIDAY.—4.15 P.M., Mr. A. H. Southam: Demonstration of Surgical Cases.

ANCOATS HOSPITAL, Manchester.
THURSDAY, Nov. 29th.—4.15 P.M., Dr. E. Duff Gray: Radiology in Obstetrics.

NEWCASTLE GENERAL HOSPITAL.
SUNDAY Nov. 25th.—10 A.M., Dr. F. J. Nattrass: Medical Ward Visit.

NOTES, COMMENTS, AND ABSTRACTS

JEAN DOMINIQUE LARREY

VISITORS to Paris who find their way to the Academy of Medicine in the Rue Bonaparte are greeted, as they enter the hall, by the gigantic and seemingly truculent statue of Baron Larrey, of whom Napoleon wrote in his will: "He is the most virtuous man I have known." When the visitor reaches the library of the Academy he meets Larrey again, this time in a large painting by Muller, who has portrayed him operating on the field of battle in Egypt. It is an animated picture which creates a taste for more. The late librarian of the Academy, Dr. Paul Busquet, has supplied this more in a vivid biography.[1] As he reads, the visitor to the Academy will correct his first impression of a truculent, bellicose Gaul, for Larrey was one of the most lovable characters of the Napoleonic wars. The son of a humble farmer in the Pyrenees, Larrey made up his mind at the age of 14 to become a surgeon, so he proceeded to tramp all the way to Toulouse. Here his uncle, a professor of surgery, gave him a classical education and the run of his hospital in which the lad made such rapid progress in his study of anatomy, medicine, and obstetrics that, at the age of 19, he was appointed professor with duties as a public lecturer. His first thesis on diseases of the bones was brilliant; the University and town of Toulouse awarded him a special medal for it. On his way on foot to Paris in 1787 the youngster nearly died of hunger and thirst. In the following year, at the Hôtel-Dieu, he had his first taste of street casualties, the outcome of fighting. He took part in the capture of the Bastille, at the head of a group of young men panting to crush the "tyrants." From now onwards we find him acting alternately as a combatant and surgeon and sometimes as the two in one. In the campaign of 1792, for example, Larrey recorded in his diary: "The Prussians had the habit at that time of stealing the uniforms of our wounded, and of then cutting their throats. I charged these cannibals with my dragoons, dispersed them and removed the half-dead wounded in my mobile ambulance in spite of the volley of shots from the battery. I had only one dragoon dismounted; I conducted them to a ravine, sheltered from the firing, and operated on them at once with the greatest success, and all four recovered."

In preparations for the Egyptian campaign Larrey collected medical supplies in Toulon and trained more than 100 surgeons. They were embarked with the supplies on one and the same boat which was captured by the English. Larrey alone escaped this fate, and reached Egypt in time to take an active part in the campaign. During the retreat from Jaffa he persuaded Napoleon to put all the horses not belonging to the cavalry at the service of the sick and wounded. Even staff officers were not exempt from this order, and their protests were vociferous. But Napoleon himself set an example by marching on foot at the head of his army. On one occasion, having just amputated a general's leg, Larrey saw English dragoons advancing on him. He picked up his instruments, slung the general on his back, and ran off with him in the direction of Alexandria. The roughness of the ground hampered the dragoons, and Larrey was able to rejoin his rear-guard with his burden.

It was suggested, when the French army was leaving Egypt with the honours of war, that the sick and wounded should be left behind as it was feared that their quarantine at Toulon would entail delays. Larrey objected, and he got his way. On the English frigate conveying him to France was a General Menou, who developed signs of plague soon after leaving Egypt. Larrey isolated himself with the general who ultimately recovered. No account of Larrey's career in Egypt would be complete without a reference to the gifts he received from grateful patients. One of them sent him 12 beautiful Circassian slaves. According to Larrey's biographer, he was much embarrassed and distributed them among his friends, not being anxious to form a harem.

Thanks to Larrey's influence Napoleon decreed that the ambulance service on the days of the great battles of the Empire should have the first right to military quarters. Even generals and staff officers had to give way to the wounded, and it was enough to scribble in chalk or charcoal: "Ambulance of the Guard" or "Ambulance of Larrey" for the wounded sheltering behind these letters to be left untouched, however much officers or men might wish to replace them. After the battle of Wagram Larrey was created Baron and awarded an annuity. He wrote his memoirs between 1810 and 1812, and was with Napoleon in the retreat from Moscow. After the battles of Lutzen and Bautzen more than 3000 young soldiers were found to be wounded in the hand. Napoleon suspected voluntary mutilation—an opinion held by all except Larrey who traced these wounds to the inexperience of the men, and persuaded Napoleon to take his view.

When Napoleon escaped from Elba Larrey joined him as chief surgeon to the Guard. At the battle of Waterloo, Wellington, surveying operations from Mont-Saint-Jean, caught sight of an ambulance waggon under the fire of the English guns and asked who this dare-devil might be; he then ordered firing to cease in that direction so that Larrey might have time to rescue the wounded, and saluted as he passed. At the end of the day Larrey helped to arm the slightly wounded so that they could defend their more seriously injured comrades. As he was retiring with his staff he was attacked by Prussian lancers. Discharging his pistols, he drew his sword and galloped at them. His horse was wounded and he was thrown. When he recovered consciousness after his fall he secured a horse, but was soon taken prisoner and condemned to be shot. As he faced a firing squad and a bandage was to be tied over his eyes a German army surgeon recognised him and secured a stay of execution. He was brought before Blücher whose son's life had been saved by Larrey in 1813. Instead of shooting him, Blücher sent a special messenger to reassure Madame Larrey.

For some years Larrey lived in straitened circumstances. In 1826, wishing to study English surgery, he visited England with his son and was given a warm reception by the leading men of the day, and by the many whose lives he had saved on various fields of battle. When street-fighting broke out again in Paris in 1830 Larrey was as busy as ever with the wounded in hospital. One evening the rioters came to his hospital insisting that he should give up the wounded members of the Royal Guard. Larrey had every door opened and, advancing in front of the rioters, he said: "Que voulez-vous? Mes blessés? Ils sont à moi, allez-vous-en!"

Appointed in 1842 to inspect the hospitals of Algeria, Larrey, now 76 years old, enjoyed a triumphal progress from town to town. His inspection revealed certain barbarous punishments against which he protested vehemently. On his return to Toulon he developed pneumonia, but when he learnt that his wife was very ill in Paris he insisted on travelling at once. He got no farther than to Lyons, where he died on July 25th, 1842, his wife having died three days earlier.

[1] Les Biographies Médicales. Nos. 5 and 6. Paris: Libraire Baillière et Fils.

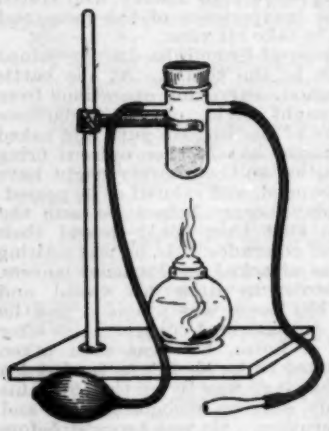
THE "DOWN-AND-OUTS"

UNDER this title Sir Philip Gibbs has written a moving appeal for subscriptions to support the work of the Providence (Row) Night Refuge and Home. This institution was founded in 1860 and has been striving with success—great success in proportion to the measure of support received from outside—

to mitigate the lot of the down-and-outs, and on many occasions the assistance offered to homeless persons in the East End of London has really been first aid, medically speaking, of invaluable sort. For 74 winters this fund has assisted the destitute, destitution being the only claim necessary for the applicants to put forward; it has provided for more than 2,750,000 of these unfortunates a free night's lodging with supper and breakfast, the help being administered upon an organised plan. The object throughout has been to help the down-and-out to help himself, giving him breathing space and so enabling him to search for work. Gifts of money and clothes will be gratefully received and acknowledged by the secretary of the Home, Sir John Gilbert, K.B.E., 15, George-street, Mansion House, London, E.C.4.

NASAL APPLICATION OF VAPOUR

Dr. A. R. FRIEL writes: To the *Laryngoscope* of October, 1932, Dr. W. A. Wells, of Washington, D.C., contributed a paper on the use of a vapour derived from iodine and other substances in the treatment of suppuration in the maxillary sinus. The vapour is obtained by heating a powder containing iodine, boric acid, carbolic acid, menthol, and cubebs, of each 4 per cent., and thymol 1 per cent.; Mr. G. F. Weiss, M.P.S. (180, Philip-lane, Tottenham, London, N.15), makes it up to 100 per cent. with kaolin. The apparatus used in America was electrically heated and costly, but Mr. Weiss has succeeded in supplying us with a Pyrex glass container. About a teaspoonful of the powder is placed in this and heat is applied with a methylated spirit lamp. The vapour is blown with a bellows into the nose (see Figure). I think this treatment might be useful for some troublesome cases of rhinitis which are not due to congestion of the inferior turbinals and retention of secretion in the lower nasal passages, but show infection in the upper nasal area. No ordinary treatment can be applied to the upper area of a child's nose, but this vapour seems to get there, judging by the disappearance of the discharge. The results in several cases treated in the Tottenham clinic were quite satisfactory. The apparatus and powder can be obtained from Mr. Weiss.



ANTENATAL CARE ON TRIAL

THE amount of antenatal care provided and the proportion of women availing themselves of it have both greatly increased in the last ten years, and in the same period maternal mortality has shown no diminution, but even a slight upward trend. Ergo, antenatal care does not prevent deaths due to childbirth. At first sight that appears to be sensible, but the question "Has antenatal work reduced maternal mortality?" to which a meeting of the National Baby Week Council addressed itself on Nov. 14th, does not really admit of a simple answer. Many factors must be taken into account. For example, as Dr. G. F. McCleary pointed out, the Registrar-General's method of classification does not remain constant, and whereas the mortality is reckoned on live births only, stillbirths and abortions are included in the number and percentage of deaths, and there is a widespread feeling, shared by such authorities as Sir Frederick Menzies and Sir George Newman, that abortions have materially increased of late years. Again, the decline in the birth-rate leads to a higher proportion of first pregnancies, which are usually considered to be more dangerous than subsequent pregnancies until the fifth.

Perhaps the most potent influence tending to counteract the benefit of antenatal care is poverty. In the last few years many of our working-class families have suffered at some time, if not continuously, from unemployment, resulting in malnutrition of the mother. It would be possible to argue that, in view of the hard times we have come through, a maternal mortality-rate which has not risen seriously is an achievement, some of the credit for which is due to antenatal work. Dr. Ethel Cassie, speaking at the meeting already referred to, went so far as to say that many mothers' lives can be saved if we are willing to pay the price. But it will not be a small price. Supervision at an antenatal clinic will not by itself save life. Much more accommodation with specialist medical treatment is called for. Dr. T. Watts Eden thinks that beds for antenatal cases are more urgently needed than more beds for confinement, and Prof. Louise McIlroy holds that if maternity hospitals finished off their job by providing sufficient postnatal beds, gynæcological hospitals would not be, as they are at present, full of the mistakes of obstetricians trying to make women fit to bear more children.

To jump to the conclusion that antenatal work has been a failure is to take a superficial view, for it does not take into account the adverse influences which exist or, a vital factor referred to by Dr. Watts Eden, the quality of the antenatal care provided. This quality, he said, is very unequal. While our conception of what is required has grown year by year, there are still too many places in which the antenatal clinic is put in charge of the junior member of the hospital or public health staff. Some evidence of what antenatal care has actually achieved may be found in maternity hospitals which divide their patients into two groups—booked and unbooked or emergency cases, the booked cases being those who attend the antenatal clinics attached to the hospital and for which the hospital takes responsibility during pregnancy. Dr. Watts Eden quoted as examples one large hospital where in 1932 the mortality-rate was 2·7 among booked cases as compared with 4·2 among those who had not received antenatal care, and a smaller hospital which showed a maternal death-rate one-fortieth of the national rate.

DOCTORS AT A FACTORY

AN invitation designed to reach every medical man and woman in Great Britain was dispatched by Messrs. Bovril Ltd., a few weeks ago. The guest was bidden to a reception at the London headquarters of the firm at Old-street, E.C., between 11.30 A.M. and 3 P.M. on Nov. 15th or 16th; his first-class return fare would be paid, and his only obligation was that of deciding at which hour he would be pleased to arrive, in order that arrangements might be made for luncheon following the tour of the factory. The response would certainly have been embarrassing unless most careful plans had been laid to cope with the immense crowds which presented themselves between the appointed hours. They were formally received by the directors, the name and town of residence of each being announced by a toastmaster, familiar to those who attend public dinners in London, in his full regalia. While guides were prepared to conduct small parties round the factories, the stream of visitors was so constant as to require no guide but the red arrows which deflected it through the proper channels. Everywhere members of the staff, distinguished by rosettes, were ready to answer questions, and the interest shown in the processes exhibited was by no means perfunctory. It was explained that the principal manufacturing process consists in the mixing of the extracts and essences which are concentrated down from a watery solution of lean beef with a very

finely milled powder prepared from another batch of fresh meat sun-dried in the Argentine; the nutritive as apart from the stimulating value of Bovril is attributed to the introduction of this powder, the final milling and blending processes being shown. It was, however, the minor mechanical devices which the audience clearly found the most engaging: the mechanism for washing dozens of glass pots, inverted to secure rapid drainage, and for turning them before they are slipped under the taps which allow a quantity of bovril exactly sufficient to drop into each pot; the machinery for fitting lids and for sticking on labels front and back, while rubber levers smooth narrow bands round the neck of each vessel with delicate precision. No process seems to be done by hand except the final paper packing, which is incredibly swift. Each girl slips a leaflet on to a flat wrapper, folds both round a pot, and gums the top—all in less than a second; the average output is 500 in an hour.

The factory is a complete unit in that its water supply is from an artesian well 650 feet deep, and its electric power and light are supplied by a private plant. Laboratories for the testing of raw materials and of the finished product are well equipped for their purpose. The arrangements for the health and comfort of the 500 factory employees seem to be quite adequate. The factory is spacious and well ventilated, and the cloakroom accommodation convenient. No medical attendance is provided, the employees being referred to their panel or private doctors when required by the nurse in charge of the first aid and rest room; any accident cases needing immediate attention are sent to St. Bartholomew's Hospital.

After their tour the visitors were refreshed by a luncheon which was organised on the same lavish scale as the rest of the entertainment.

NEW PREPARATIONS

AMPHYL.—Messrs. Lysol Limited, Raynes Park, London, S.W.20, have put on the market under the name of Amphyl a new disinfectant and antiseptic prepared by them. The carbolic acid coefficient in respect of *B. typhosus* (Lister strain, active 24-hours culture) is 12·4, and it is claimed that the germicidal potency is not specific but extends to different pathogenic bacteria and fungi. Even undiluted amphyl is almost non-toxic for animals. Experiment gives the minimum lethal dose for rabbits or guinea-pigs as 10·5 mg. per gramme of body-weight by mouth and 12 to 14 subcutaneously. These doses would correspond to over one pint of the concentrated fluid for a man weighing 10 st. Amphyl is a liquid of neutral reaction and rather pleasant smell, miscible with water in all proportions and depressing the surface tension so that it penetrates into the folds and crevices of tissues otherwise inaccessible. This reduction of surface tension is practically constant over the whole range of recommended dilutions. Its bactericidal efficiency is only slightly affected by the presence of organic matter. The preparation is intended for use in disinfecting the hands (½ per cent.), sterilising instruments and rubber gloves (2 per cent.), and sick-room utensils (1 per cent.). A dilution of ¼ to 1 per cent. is suggested for use as a topical antiseptic and lotion for infected wounds, a dilution of ½ per cent. as an oral antiseptic, nasal or vaginal douche. We understand that samples of the new product are now available to the medical profession. The makers claim that the cost of amphyl is low for an effective antiseptic.

DIVINE KINGSHIP[1]

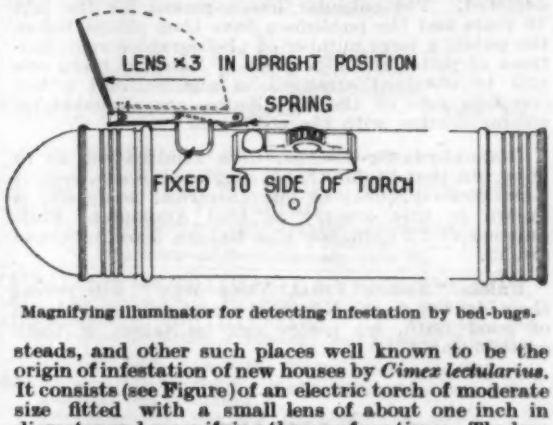
THE Frazer lecture for 1933, which was delivered at the University of Liverpool by Prof. C. G. Seligman, Professor of Ethnology in the University of London, has at first sight little relation to medicine; but as ethnologists, archæologists, and antiquarians arrive at, and summarise, more knowledge of bygone peoples, so we get information that may at any time assist us to comprehend old manners and customs, and these have their reflection in hygiene. Prof. Seligman gives here the story of Divine Kingship as instituted 5000 years or more ago in Upper Egypt. The health of the elected king of the tribe was associated in native idea with the vegetation of the land, the irrigation and cultivation of the crops, and the general prosperity. Apparently he was slain, either when he had reigned a fixed number of years or when he had grown old. Both his installation and his removal were attended with ceremonies, and to the former Prof. Seligman directs the attention of researchers as possibly containing useful lessons. The paramount, if not the only anxiety of ancient tribal man was the certainty of his food supply. It is clear that a monarch, who was his own Minister of Agriculture, and who knew that his span of existence was measured by the success of his administration, would be a very careful official. From that point of view the institution of a Divine Kingship seems quite sensible.

[1] Egypt and Negro Africa: a Study in Divine Kingship. London; George Routledge and Sons, Ltd. Pp. 82. 3s. 6d.

A BED-BUG ILLUMINATOR

Dr. William C. Gunn, senior assistant medical officer of health for Glasgow, sends us particulars of a magnifying illuminator useful in the detection of bed-bug infestation.

"This handy instrument," he writes, "will be found of service by sanitary inspectors and others who have occasion to search dark corners of rooms, bed-



Magnifying illuminator for detecting infestation by bed-bugs.

steads, and other such places well known to be the origin of infestation of new houses by *Cimex lectularius*. It consists (see Figure) of an electric torch of moderate size fitted with a small lens of about one inch in diameter and magnifying three or four times. The lens is mounted near the fore end of the torch with a slight inclination forward so that it is directed upon the most brightly illuminated part of the field. The lens also folds back so that the torch can be more easily carried in the pocket. It will be found that the eggs of the bed-bug and other features of an infested corner are sufficiently enlarged to enable a definite diagnosis of infestation to be made. The torch is easily manipulated and tenants who are the victims of infestation can be shown the reason why the sanitary officer is making his demands for cleansing. Apart from the utility of this magnifying illuminator in the pursuit of the bed-bug, there are many other useful purposes which it will serve." At present it is produced by John Trotter, Limited, Manufacturing Opticians, 40, Gordon-street, Glasgow.

NUMEROUS TAPPINGS FOR ASCITES

A CASE of ascites due to chronic polyserositis (Pick's disease) in which paracentesis was done no less than 250 times is reported by P. F. Nigst (Schweiz. med. Woch., 1934, xlii., 966).

The patient, a locksmith aged 48, sprained his left knee in April, 1918. A month later the knee suddenly swelled and became acutely painful. He was admitted to hospital, with swelling, pain and redness of the power part of the thigh, and fever. Pus was found on aspirating the knee-joint, and

operation revealed a focus of acute osteomyelitis in the lower end of the femur. He made a slow recovery, and a sinus persisted for two years. Ankylosis of the joint took place.

In December, 1918, ascites was first noticed. Shortly afterwards jaundice developed, and as time went on the liver became more and more enlarged and hard, the area of cardiac dullness increased, dullness developed over the right side of the chest, and there was marked cardiac arrhythmia and dyspnœa. The patient survived, a complete invalid, for 16 years, during which he was tapped 250 times. In addition, the right pleural cavity was tapped three times. Death took place in September, 1933, and post-mortem examination revealed complete obliteration of the pericardial sac, with dilatation of the heart and changes due to back pressure in distant organs; fibrous thickening of the pleura on both sides, a left-sided hydrothorax and right-sided serofibrinous pleurisy; chronic fibrous peritonitis with "sugar-icing" liver and spleen.

It is suggested that the bone-infection was the original cause of the trouble.

A MEDICAL ART CALENDAR.—As last year the firm of J. Philip Kruseman of the Hague send us an album in which well-known pictures are reproduced having as their subjects medical occurrences, portraits of distinguished doctors, and various scenes in social life in which sickness or the relief of sickness are depicted. The calendar has appeared for the last 16 years and the publishers have thus placed before the public a large number of photographic reproductions of pictorial masterpieces. Many of them can still be obtained arranged in albums, and a few complete sets of the 16 albums are available on communication with the publishers.

DIALURETHANE.—Messrs. Ciba Limited ask us to point out that Dialurethane, suggested in our issue of Nov. 10th (p. 1061) as an obstetrical analgesic, is known in this country as Dial Ampoules. Each ampoule of 2·3 c.cm. contains dial grs. 3 and urethane grs. 12.

Unless "THREE FINAL YEAR MEN" will reveal their identity to the Editor in confidence, as evidence of good faith, no notice can be taken of their contribution.

Vacancies

For further information refer to the advertisement columns

Albert Dock Hospital, Connaught-road, E.—Res. M.O. At rate of £110.

All Saints' Hospital, Austral-street, Southwark, S.E.—Hon. Surg. Reg. Also Res. H.S. At rate of £100–£150.

Bath and Wessex Children's Orthopædic Hospital, Combe Park. H.S. At rate of £120.

Battersea Metropolitan Borough.—Tuber. O. and Asst. M.O.H. £325.

Belfast, Joint Nursing and Midwives' Council, Northern Ireland.—Examiners for Midwives.

Birmingham, Dudley-road Hospital.—Res. Phys. £650.

Birmingham, West Heath Sanatorium, Northfield.—Jun. M.O. At rate of £200.

Brighton, Sussex Maternity and Women's Hospital.—Res. H.S. £130.

Canterbury, Kent and Canterbury Hospital.—H.S. At rate of £125.

Cardiff, Royal Infirmary.—Hon. Asst. Surg. Also Hon. Asst Gynæcologist.

Cardiff, Welsh National School of Medicine.—Prof. of Surgery and Director of Surg. Unit. £1500. Also Sen. Asst. in Surg. Unit. £750.

Central London Ophthalmic Hospital, Judd-street, W.C.—Asst. Surgeon.

Charing Cross Hospital, W.C.—Asst. Physician.

City of London Hospital for Diseases of the Heart and Lungs, Victoria Park, E.—Res. M.O. £250. Also H.P. at rate of £100.

Croydon General Hospital.—Res. M.O. £200.

Derbyshire Hospital for Sick Children.—Res. H.S. At rate of £130.

Dreadnought Hospital, Greenwich, S.E.—H.P. and H.S. Each at rate of £110.

Dumfries, Crichton Royal Mental Hospital.—Locum Tenens for Asst. P. 7 gns. weekly.

Eastbourne, St. Mary's Municipal Hospital.—Res. H.S. £150.

Elizabeth Garrett Anderson Hospital, Euston-road, N.W.—Hon. Clin. Asst. to Spec. Depts.,

Evelina Hospital for Sick Children, Southwark, S.E.—H.S. At rate of £120.

Exeter City Mental Hospital.—Asst. M.O. £400.

Gloucestershire Royal Infirmary, &c.—Res. H.P. and H.S. Each at rate of £150.

Golden-square Throat, Nose, and Ear Hospital, W.—H.S. £100.

Hampstead General and North-West London Hospital, Haverstock-hill, N.W.—H.S. At rate of £100.

Hartlepool, Hartlepools Hospital.—H.S. At rate of £150.

Hospital for Consumption, &c., Brompton, S.W.—H.P. At rate of £50.

Hospital for Sick Children, Great Ormond-street, W.C.—H.P., and H.S. Each at rate of £100. Also Anæsthetist, 15 gns.

Hospital for Tropical Diseases, Gordon-street, W.C.—H.P. At rate of £120.

Hull Municipal Maternity Home and Infants' Hospital.—Jun. Res. M.O. At rate of £100.

Hull Royal Infirmary.—Res. Surg. Officer. £200.

Ilford, King George Hospital.—Res. Med. and Surg. O.'s. Each £250 Also Cas. O. At rate of £150. Also H.P. and H.S. Each at rate of £100.

Indian Medical Service.—Commissions.

Ipswich, East Suffolk and Ipswich Hospital.—Cas. O. £150.

Kensington Royal Borough.—Asst. M.O.H. and Tuber. O. £750.

King's College Hospital, Denmark Hill, S.E.—Two Med. Registrarships. Also Jun. Surgeon.

Lincoln, The Lawn.—Asst. M.O. £300.

Liverpool Central Venereal Diseases Clinic.—Assist. Venereal Diseases M.O. £300.

London County Council.—Asst. M.O.'s Grade I. £350. Grade II. £250.

London Lock Hospital and Home, Harrow-road, W.—Hon. Surgeon.

Maidstone, West Kent General Hospital.—H.P. £150.

Manchester, Ancoats Hospital.—H.S. to Spec. Depts. At rate of £100.

Manchester Babies Hospital, Burnage-lane, Levenshulme.—Jun. Res. M.O. At rate of £75.

Manchester, Baguley Sanatorium.—Asst. M.O. At rate of £250.

Manchester Ear Hospital, Grosvenor-square, All Saints'.—Res. H.S. £120.

Middlesbrough, North Riding Infirmary.—Cas. O. At rate of £150.

Middlesex Hospital and Medical School, W.—Surg. Registrarship. £300.

Miller General Hospital, Greenwich, S.E.—Asst. Radiologist. £125. Refractionist. 52 gns. Also Res. Surg. O. and Reg. £250.

New Zealand, University of Otago, Dunedin.—Sen. Ass. in Physiology Dept. £550.

Northampton General Hospital.—Hon. Asst. Surgeon.

Plymouth, Prince of Wales's Hospital.—H.P. and H.S., each at rate of £130. Also Res. Anæsthetist and H.S. to Spec. Depts., at rate of £120.

Port of London Sanitary Authority.—Boarding M.O. £500.

Princess Elizabeth of York Hospital for Children, Shadwell, E.—Res. M.O. £200.

Princess Louise Kensington Hospital for Children, St. Quintin-avenue, W.—H.S. At rate of £100.

Queen Charlotte's Maternity Hospital, Marylebone-road, N.W.—Res. Anæsthetist. At rate of £100. Also Res. Anæsthetist and Dist. Res. M.O. At rate of £90. Also Asst. Res. M.O. At rate of £80.

Queen Mary's Hospital for the East End, E.—Res. M.O. and Cas. O. At rate of £200 and £150 respectively. Also H.S.'s and H.P., Obstet. H.S. Also Res. Anæsthetist and H.P. Each at rate of £120.

Queen's Hospital for Children, Hackney-road, E.—H.P. and Cas. O. Each at rate of £100.

Royal Free Hospital, Gray's Inn-road, W.C.—Surg. Reg. £200. Also Res. Cas. O. At rate of £150. Also Med. Reg. and Gynæc. Reg. Each at rate of £100. Also First H.P. and Second H.S.

Royal Masonic Hospital, Ravenscourt Park, W.—Physician Surgeon. Also Ophth. Surgeon.

Royal Northern Hospital, Holloway, N.—Second Ophth. Surgeon.

Royal Waterloo Hospital for Children and Women, Waterloo-road, S.E.—Hon. Clin. Asst.

St. Margaret's Hospital, Leighton-road, N.W.—Con. Ophth. S. £125.

Salford Royal Hospital.—Res. Surg. O. £200. Also H.P. and H.S. Each at rate of £125.

Sheffield, Jessop Hospital for Women.—H.S. to Maternity Dept. Also H.S. At rate of £120 and £100 respectively.

Southampton, Borough Isolation Hospital.—Res. M.O. £360.

Sunderland Royal Infirmary.—R.M.O. Also H.S. £250 and £120 respectively.

Swanley, Kent, White Oak Hospital.—Cons. Ophth. Surg. £300

Tilbury Hospital.—Med. Supt. £200.

West London Hospital, Hammersmith, W.—H.P., two H.S.'s, Res. Anæsthetist. Each at rate of £100. Also Res. Asst. Surgeon. £200.

Westminster Hospital, Broad Sanctuary, S.W.—Surg. Regs. Each £250.

Winchester, Royal Hampshire County Hospital.—H.P. At rate of £125.

Windsor, King Edward VII. Hospital.—Res. M.O. £200. Also Three H.S.'s. Each at rate of £100.

The Chief Inspector of Factories announces vacant appointments for Certifying Factory Surgeons at Muirkirk, Ayrshire; and at Tonbridge and Herne Bay, Kent.